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RED SEA
AND GULF OF ADEN
PILOT.
FIFTH EDITION, 1900.

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HARVARD UNIVERSITY.



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British Admiralty

THE
R E D S E A
AND
GULF OF ADEN PILOT,

CONTAINING DESCRIPTIONS OF
THE SUEZ CANAL, THE GULFS OF SUEZ AND AKABA,
THE RED SEA AND STRAIT OF BAB-EL-MANDEB, THE
GULF OF ADEN WITH SOKÓTRA AND ADJACENT
ISLANDS, AND PART OF THE EASTERN
COAST OF ARABIA.

FIFTH EDITION.

1900.

W. H. & Co.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:
PRINTED FOR THE HYDROGRAPHIC OFFICE, ADMIRALTY,
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31, POULTRY, AND 11, KING STREET, TOWER HILL.
S^d 1900.

Price Three Shillings and Sixpence

ADVERTISEMENT TO THE FIFTH EDITION.

THE Red Sea and Gulf of Aden Pilot comprises directions for the navigation of the Suez canal, the gulf of Suez and the central track for steam-ships through the Red Sea, strait of Bab-el-Mandeb, and gulf of Aden, to the Arabian Sea and ports beyond ; also, descriptions of the gulf of Akaba, the African and Arabian coasts of the Red Sea, and gulf of Aden, including Sokótra and adjacent islands, and part of the eastern coast of Arabia. It was originally published in two volumes as (1) The Red Sea Pilot, (2) The Gulf of Aden Pilot.

The second edition of the Red Sea Pilot (1873) was compiled by Staff Commander J. Cumins Richards, R.N., from sailing directions drawn up by Commanders R. Moresby and T. Elwon, of the Indian Navy, and published in 1841, by order of the Court of Directors of the East India Company ; and information from more recent authorities, including the surveys of 1871-2 by H.M. ships *Newport* and *Shearwater*, Captain G. S. Nares, R.N. ; these surveys embraced the Gulf of Suez and the West coast of the Red Sea from thence to Koseir.

The third edition, published in 1883, included the results of the surveys made by Commanders W. J. L. Wharton, R.N., and Pelham Aldrich, R.N., in H.M.S. *Fawn*, 1876-82. Additions from the remark books of officers of H.M. ships were also introduced.

The Gulf of Aden Pilot was originally compiled by Commander C. Y. Ward, I.N., in 1863, from the following authorities, chiefly officers of the late Indian Navy :—

The Somali coast from the strait of Bab-el-Mandeb to Ras Hafun was chiefly from the surveys of Captain Carless, I.N., in 1838 ; Lieutenant W. C. Barker, I.N., in 1841 ; and Lieutenant A. M. Grieve, I.N., in 1848.

The island of Sokótra was from the survey of Captain S. B. Haines, I.N., in 1834-35 ; and the islands westward of it from the survey of Lieutenant A. M. Grieve, I.N., in 1848.

The Arabian coast, from the strait of Bab-el-Mandeb to Ras Al-Hadd, was from the surveys of Captain S. B. Haines, I.N., in 1833-34-35 ; Captain J. P. Sanders, I.N., in 1844-45 ; and Lieutenant A. M. Grieve, I.N., in 1846-48-49 ; including a Memoir by H. J. Carter, Esq., Bombay Medical Service.

The description of the prevailing winds and currents was from the same sources, as also from the investigations made by Lieutenant A. D. Taylor, I.N. ; Lieutenant Ferguson, I.N. ; and the Admiralty Wind and Current Charts.

x (3)9640. 4000.—7,1900. Wt. 19060.

A second edition of the Gulf of Aden Pilot, published in 1882, was prepared by Captain G. H. Inskip, R.N., and included all the information available to the date of publication.

The third edition, published in 1887, was prepared by Staff-Commander C. H. C. Langdon, R.N., of the Hydrographic Department, and included the most recent information resulting from the visits of Her Majesty's vessels. In this edition the names of places in the gulf of Aden and eastern coast of Arabia were corrected chiefly on the authority of Major Hunter, H.M. Political Agent at Aden; and Lieut.-Colonel E. Mockler, Political Agent and Consul at Maskat.

The Red Sea and Gulf of Aden Pilot, fourth edition, 1891, as issued in one volume, was prepared by Captain E. H. Hills, R.N., and included the results of the surveys by H.M. ships *Rambler*, *Myrmidon*, *Stork*, *Sylvia*, and others; as also information derived from H.M. ships and transports, mail steamers, Consular and other Government officers' reports, and official information supplied by the Egyptian, French, and Italian governments. The remark books of officers of H.M. ships engaged in the operations during the Sudanese rebellion largely increased the general knowledge of the western shore of the Red Sea; whilst the statistical information supplied by the Meteorological Office was of great value with regard to the winds, currents, temperature, &c., of the regions under consideration in this work.

The present edition has been prepared by Captain John Phillips, R.N., from the latest information available.

Officers of the Royal Navy and Mercantile Marine are requested to transmit to the Secretary of the Admiralty notices of any errors or omissions they may discover, as well as any fresh information they may obtain, with a view to the improvement of this work for the general benefit of navigation.

By the publication of this work, all former editions, as also all Supplements or Hydrographic Notices relating to former editions, and all Notices to Mariners, inclusive of No. 352 of 1900, are cancelled.

W. J. L. W.

Hydrographic Office,
Admiralty, London,
July, 1900.

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ARABIC WORDS IN FREQUENT USE IN THE DIRECTIONS AND ON THE CHARTS.

<i>Arabic.</i>	<i>English.</i>
Abu or Bu - - -	- Father of, <i>i.e.</i> , producing or abounding in ; also, large.
Bab - - -	- A narrow strait or gut ; literally, a door or gate.
Bander - - -	- A harbour or anchorage.
Balad - - -	- A town or village.
Bar - - -	- The land.
Beiyat - - -	- A shoal, dry at low water.
Ghubbet - - -	- A bay or gulf.
Hassar - - -	- A rock.
Jebel - - -	- A hill or mountain ; also an island.
Jezirat - - -	- An island.
Kad - - -	- A shoal.
Katah or Katat - -	- A patch of rocks.
Kinasat - - -	- A shoal or sandbank.
Karn - - -	- A peaked hill, a horn, a point.
Kehir - - -	- Large.
Khor - - -	- A creek or lagoon, an inlet.
Mersa - - -	- An anchorage.
Nakhil - - -	- A date grove.
Ras - - -	- A cape or headland.
Rig - - -	- A shallow flat bank, extending off-shore.
Seil - - -	- A torrent.
Séria or Seghir - -	- Small.
Shab - - -	- A rocky shoal.
Sherm - - -	- A creek or small cove.
Umm - - -	- Mother of ; similarly used to Abu.
Wadi - - -	- A valley or river.

[NOTE.—In some parts of the Red Sea, the Arabic letter given as *k* in the Roman character is often pronounced as a deep guttural *g*. Thus Akaba is often pronounced Agaba.]

SYSTEM OF ORTHOGRAPHY.

Adopted by the Admiralty for Sailing Directions and Charts.

As far as has been found possible with existing knowledge, native names are spelt in accordance with the following system, which has been adopted by the principal authorities in Great Britain and by the United States, and has been for some years in process of gradual introduction into all Admiralty Sailing Directions and Charts.

No change is made in the orthography of foreign names in countries which use Roman letters; thus French, Spanish, Portuguese, Dutch, &c. names will be spelt as by the respective nations.

1. Where native names have been so long written in a form, which, though not in accordance with this system, has become familiar to English eyes from being so spelt in all charts and maps, they are retained.

2. The true sound of the word as locally pronounced is taken as the basis of the spelling.

3. An approximation of the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself.

4. The broad features of the system adopted are that vowels are pronounced as in Italian and consonants as in English, *every letter being pronounced*. Two accents only are used:—

(1.) The acute, to denote the syllable on which stress is laid. The use of this is very important, as the sounds of many names are entirely altered by the misplacement of this “stress.”

(2.) The sign \sim over the letter U to denote the short sound of that vowel under certain circumstances. (See table.)

5. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai*, *au*, *ei*.

The amplification of the rules is given on the following pages.

Information is invited as to the proper spelling of native names, so as to produce the nearest approximation to the true sound, by this system.

Letters.	Pronunciation and Remarks.	Examples.
a	<i>ah</i> , <i>a</i> as in <i>father</i> - - -	Java, Banána, Somáli, Bari.
e	<i>eh</i> , <i>e</i> as in <i>benefit</i> ; <i>a</i> as in <i>fate</i> - -	Tel-el-Kebír, Oléleh, Yezo, Levúka, Peru
i	English <i>e</i> ; <i>i</i> as in <i>ravine</i> ; the sound of <i>ee</i> in <i>beet</i> . Thus, not <i>Feejee</i> , but	Fiji, Hindi.
o	<i>o</i> as in <i>mote</i> - - - -	Tokyo.
u	long <i>u</i> as in <i>flute</i> ; the sound of <i>oo</i> in <i>boot</i> . <i>oo</i> or <i>ou</i> should never be employed for this sound. Thus, not <i>Zooloo</i> or <i>Zoulou</i> , but - - - - The shorter sound of the different vowels, when necessary to be indicated, can be expressed by doubling the con- sonant that follows. The sounds referred to are as follows :— The short <i>a</i> as in <i>fatter</i> , as compared with the long <i>a</i> as in <i>father</i> . The short <i>e</i> as in <i>better</i> , as compared with the long <i>e</i> as in <i>fate</i> . The short <i>i</i> as in <i>sinner</i> , as compared with the long <i>i</i> as in <i>ravine</i> . The short <i>o</i> as in <i>sobbing</i> , as com- pared with the long <i>o</i> as in <i>sober</i> . The short <i>u</i> as in <i>rubber</i> , as compared with the long <i>u</i> as in <i>rubric</i> .	Zulu, Sumatra. Yarra, Tanna, Mecca, Jidda, Bonny.*
ũ	is the same short sound of <i>u</i> as is denoted by doubling the consonant following, but is used, and only used, where such doubling is impossible, as in case of words where <i>u</i> is followed by two different consonants, as in <i>Tűng</i> , pronounced as the English <i>tongue</i> . Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Nuulúa, Oo sim
ni	English <i>i</i> as in <i>ice</i> - - -	Shanghai.
au	<i>ow</i> as in <i>how</i> . Thus, not <i>Foochow</i> , but -	Fuchau.
ao	is slightly different from <i>au</i> - - -	Macao.
aw	when followed by a consonant or at the end of a word, as in <i>law</i> - thus	Cawnpore.

* The *y* is retained as a terminal in this word under rule 1. The word is given as a familiar example of the alteration in sound caused by the second consonant.

Letters.	Pronunciation and Remarks.	Examples.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from <i>ey</i> in the English <i>they</i> , or <i>ei</i> in <i>eight</i> .	Beirút, Beilul.
b	English <i>b</i> .	
c	is always soft, but is so nearly the sound of <i>s</i> that it should be seldom used. If <i>Celébes</i> were not already recognised it would be written <i>Selébes</i> .	Celébes.
ch	is always soft, as in <i>church</i> - - -	Chingchin.
d	English <i>d</i> .	
f	English <i>f</i> . <i>Ph</i> should not be used for the sound of <i>f</i> . Thus, not <i>Haiphong</i> , but	Haifong, Nafa.
g	is always hard. (Soft <i>g</i> is given by <i>j</i>) -	Galápagos.
h	is always pronounced when used.	
hw	as in <i>what</i> , better rendered by <i>hw</i> than <i>wh</i> , or <i>h</i> followed by a vowel. Thus, <i>Hwang ho</i> , not <i>Whang ho</i> or <i>Hoang ho</i> .	Hwang ho, Ngan hwei.
j	English <i>j</i> . <i>Dj</i> should never be put for this sound.	Japan, Jinchuen.
k	English <i>k</i> . It should always be put for the hard <i>c</i> . Thus, not <i>Corea</i> , but -	Korea.
kh	The Oriental guttural - - -	Khan.
gh	is another guttural, as in the Turkish -	Dagh, Ghazi.
l	} As in English.	
m		
n		
ng	has two separate sounds, the one hard as in the English word <i>finger</i> , the other as in <i>singer</i> . As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
ph	As in <i>loophole</i> - - - -	Mokpho, Chemulpho.
th	Stands both for its sound in <i>thing</i> , and as in <i>this</i> . The former is most common.	Bethlehem.
q	should never be employed; the sound of <i>qu</i> in <i>quiver</i> is given as <i>kw</i> . When <i>qu</i> has the sound of <i>k</i> , as in <i>quoit</i> , it should be given by <i>k</i> .	Kwangtung.

Letters.	Pronunciation and Remarks.	Examples.
r	As in English.	
s	As in <i>sin</i> .	
sh	} As in English. - - - - -	Sawákin.
t		
v		
w		
x		
y	is always a consonant, as in <i>yard</i> , and therefore should never be used as a terminal, <i>i</i> or <i>e</i> being substituted. Thus not <i>Mikindány</i> or <i>Wady</i> , but not <i>Kwaly</i> , but	Kikūyu. Mikindáni, Wadi. Kwale.
z	English z - - - - -	Zulu.
zh	French <i>j</i> , or as <i>s</i> in <i>treasure</i> - - - Accents should not generally be used, but where there is a very decided emphatic syllable or stress which affects the sound of the word, it should be marked by an <i>acute</i> accent - - -	Muzhdaha. Tongatábu, Galápagos, Paláwan, Saráwak.

In the case of native names in countries under the dominion of other European powers, in whose maps, charts, &c., the spelling is given according to the system adopted by that power, such orthography is, as a rule, disregarded, and the names are spelt according to the British system. Thus the island east of Java in possession of the Dutch is spelt Madoera by them, but on Admiralty charts Madura. A town in Java appears on Dutch charts as Tjilatjap; in the British, Chilachap.

When a foreign language is written in a vocabulary of fixed sounds, so as to permit of transliteration into the British system, a table of equivalents for each letter is drawn up, and names of places can be transliterated without regard to pronunciation.

INFORMATION RELATING TO CHARTS, SAILING DIRECTIONS, AND THE GENERAL NAVIGATION OF H.M. SHIPS.

ON THE CORRECTION OF CHARTS, LIGHT LISTS, AND SAILING DIRECTIONS.

There are three descriptions of publications as guides to navigation—the charts, the sailing directions, and the light lists—which are all affected by the continual changes and alterations that take place.

Of these the charts should always be, so far as our knowledge permits, absolutely correct to date; and the light lists should be noted for the recent alterations, though space will not permit of full details being always inserted; the sailing directions, however, cannot, from their nature, be so corrected, and *in all cases where they differ from charts, the charts must be taken as the guide.*

1. *Charts.*—When issued to a ship on commissioning, the charts have received all necessary corrections to date. As sent from the Hydrographic Office they are, as a rule, fresh from the plates. They then receive such corrections by hand in the dépôts as are required, and are so issued to the ships.

All small but important corrections that can be made by hand are notified by Notices to Mariners, and should at once be placed on the charts to which they refer.

Large corrections that cannot be conveniently thus made are put upon the plates, and fresh copies are issued to the ships to replace the others, which are directed to be destroyed to prevent the possibility of their being used in the navigation of the ship.

The dates on which these large corrections are made are noted on the chart plates in the middle of the lower edge; those of the smaller corrections at the left-hand lower corners.

In all cases of quotations of charts, these dates of corrections should be given, as well as the number of the chart (which will be found in the lower right-hand corner), in order that at the Admiralty it may be known what edition of the chart is referred to.

2. *The Light Lists*, annually published at the beginning of each year, are not corrected in the depôts before issue, but appendices are issued every two months, giving the alterations that have taken place, copies of which are put into the chart boxes.

It is the duty of the navigating officer when he receives the set of charts to make notations in the light lists from these appendices, and from the Notices to Mariners in the box; and to keep them so corrected from time to time.

The Light Lists should always be consulted as to details of a light, as the description in the Sailing Directions may be obsolete, in consequence of changes made since publication.

3. *The Sailing Directions* are not corrected before issue, except occasionally for very important new rocks or dangers. Hydrographic Notices and Supplements referring to each volume are published from time to time.

Supplements contain all the information received up to date since the publication of the volume to which they refer, and cancel all previous Hydrographic Notices.

Hydrographic Notices contain all information up to date since the publication of the volume, or since the last Supplement or Hydrographic Notice, but endeavour is made to issue no more than one of these affecting each volume, and, on the collection of fresh information, to include the former Notice in a Supplement.

The existence of Supplements or Hydrographic Notices is to be noted, in the tabulated form placed for the purpose inside the cover of each volume, in cases when such notations have not been made before issue, and also on receipt of further Notices after commission.

Notes should be made in the margin of the volume of sailing directions affected, as references to the Supplements or Hydrographic Notices when the latter are printed on both sides.

To enable the books to be more conveniently corrected, however, such Supplements and Hydrographic Notices as are of moderate size are now being printed on one side only, and two copies are issued to each ship; one to cut up, the slips being pasted in at the appropriate place; the other to retain intact for reference.

To make these notations or paste in these slips is one of the early duties of a navigating officer after drawing his box of charts and books, and similar notes are to be made from Notices to Mariners that may thereafter be received.

It must, however, be thoroughly understood that sailing directions will never be correct in all details, except up to the date of the last Hydrographic Notice or Supplement, and that, as already stated, when differences exist, the chart, which should be corrected from the most recent information, should be taken as the guide; for which purpose, for ordinary navigation, they are sufficient.

THE USE OF CHARTS AS NAVIGATIONAL AIDS, AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

1. *Accuracy of a Chart.*—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger is the scale of the chart.

To estimate this, the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fulness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch.

A wide berth should therefore be given to every rocky shore or patch, **and this rule should be invariably followed, viz., that instead of considering a coast to be clear unless it is shown to be foul, the contrary should be assumed.**

2. Fathom Lines a Caution.—Except in plans of harbours that have been surveyed in detail, the five-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, another warning, especially for ships of heavy draught.

Charts where no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed round, as there is no knowing how closely the spot may have been examined.

3. Chart on largest scale always to be used.—It sometimes happens that, from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or soundings. This is an additional reason, besides the obvious one of the greater detail shown on a larger scale chart, why this largest scale chart should always be used for navigating.

4. Caution in using small Scale Charts.—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. This is particularly to be observed when coming to an anchor on a narrow ledge of convenient depth at some distance from the shore.

For the same reason bearings to objects near should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

5. Distortion of Printed Charts.—The paper on which charts are printed has to be damped. On drying distortion takes place, from the inequalities in the paper, which greatly varies with different paper and the amount of the original damping; but it does not affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines to objects be long. The larger the chart the greater the amount of this distortion.

6. Buoys.—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should therefore be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings or angles of fixed objects on shore and not by buoys.

Gas Buoys.—The lights shown by gas buoys cannot be implicitly relied on, as if occulting the apparatus may get out of order, or the light may be altogether extinguished.

7. Lights.—Circles drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely indicate, in the case of lights which do not show equally in all directions, the bearings between which the variation, or visibility, or obscuration of the light occurs.

All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height at end of each Light List, affords a means of ascertaining how much more or less the light is visible should the height of the bridge be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again,

refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its order, as given in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles, if of any power. (See table in Light List above mentioned.)

8. Fog Signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from wind, large areas of silence have been found in different directions and at different distances from the origin of a sound, even in clear weather. Therefore too much confidence should not be felt in hearing a fog signal. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly towards the land, and is not observed by the people at a lighthouse until it is upon them; whereas a ship may have been for many hours in it, and approaching the land. In such a case no signal may be sounded. When sound has to travel against the wind, it may be thrown upwards; in such a case, a man aloft might hear it when it is inaudible on deck.

Taken together, these facts should induce the utmost caution in closing the land in fogs. The lead is generally the only safe guide.

9. Tides and Tidal Streams.—In navigating coasts where the tidal range is considerable, caution is always necessary. It should be remembered that there are indraughts to all bays and bights, although the general run of the stream may be parallel to the shore.

The turn of the tidal stream off shore is seldom coincident with the time of high and low water on the shore. In open channels, the tidal stream ordinarily overruns the turn of the vertical movement of the tide by three hours, forming what is usually known as tide and half-tide, the effect of

which is that at high and low water by the shore the stream is running at its greatest velocity.

In crossing a bar or shallow flats, the table (B) at page 98 of the Tide Tables will be found of great assistance in calculating how much the water has risen or fallen at any hour of the tide.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can never be depended upon, and additional caution is necessary.

It should also be remembered that at times the tide falls below the level of low-water ordinary springs. This always occurs on the coast of Europe at the equinoxes, but wind may produce it at any time, and the amount varies with locality. When the moon's perigee coincides with the full or new moon the same effect is often produced.

10. Current Arrows on charts only show the most usual or the mean direction of a tidal stream or current. It must never be assumed that the direction of a stream will not vary from that indicated by the arrow. In the same manner, the rate of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

11. Fixing Position.—The most accurate method of fixing a position relative to the shore is by angles between well-defined objects on the chart. All ships are now being supplied with a station-pointer, and this method should be used whenever possible.

Two things are, however, necessary to its successful employment. First, that the objects be well chosen; and second, that the observer is skilful and rapid in his use of the sextant.

For the former, reference can be had to the pamphlet on the use of the station-pointer, which is in every chart box.

The latter is only to be obtained by practice.

It will readily be seen that in war time, when the compass may be knocked away, or rifle-fire may make it undesirable to expose the person more than necessary, a sextant offers great advantages, as angles can be obtained from any position whence the objects are visible. It is this contingency that makes it especially desirable that all navigating officers should become expert in this method of fixing a ship's position.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

It is not intended that the use of the compass to fix the ship should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed.

In all cases where great accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal, or of additions to a chart, as fresh soundings or new buildings. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. In the case of ordinary soundings, it is only necessary to take a third angle now and then; firstly, to check the general accuracy of the chart as above stated; secondly, to make certain that the more important soundings, as at the end of a line, are correctly placed.

Sometimes, when only two objects are visible, a compass bearing and sextant angle may be used with advantage.

In passing near a point of land, or an island, the method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "four-point bearing," when the bearing is taken four points on the bow, and on the beam, the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives an excellent fix for a departure, but does not ensure safety, as the point, and probably the rocks off it, are abeam before the position is obtained.

By taking the bearings of two points and four points on the bow, a very good position is obtained before the object is passed; the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current.

A table of factors, by which to multiply the distance run, to obtain the distance of the object when any number of degrees between the two bearings has been observed, is now supplied in all chart boxes.

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In ships still fitted with the Admiralty standard compass, the tripod supplied to hold the lamp will be found of great service in fixing position at night, as by its aid a bearing can be as accurately taken as in daylight. With Thomson's compass bearings can also be accurately observed at night. The utility of this in connection with ascertaining the change of bearing of an approaching ship's light should not be forgotten.

Amongst astronomical methods of fixing a ship's position, attention is drawn to the great utility of Sumner's method. A Sumner line, that is, a line drawn through the position (obtained by an assumed latitude and longitude by chronometer) at right angles to the bearing of the sun, as obtained from the azimuth tables, gives at times invaluable information, as the ship must be somewhere on that line provided the chronometer is correct. A deep cast at the same time may often serve to get an approximate position on the line. An early and very accurate position can be also obtained by Sumner's method, by getting longitude by a bright star at daylight when the horizon is well visible, and another longitude by the sun when a few degrees above the horizon, or by observing two or more stars at twilight. The Sumner lines drawn through the two positions thus obtained will, if the bearing of sun and star differ three points or more, give an excellent result.

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Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together.

The law which has hitherto been found to hold good as regards local magnetic disturbance is, that north of the magnetic equator the north end of the compass needle is attracted towards any centre of disturbance; south of the magnetic equator it is repelled.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

14. *Use of Oil for Modifying the Effect of Breaking Waves.*—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows :—

1. On free waves, *i.e.*, waves in deep water, the effect is greatest.
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 7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.
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10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

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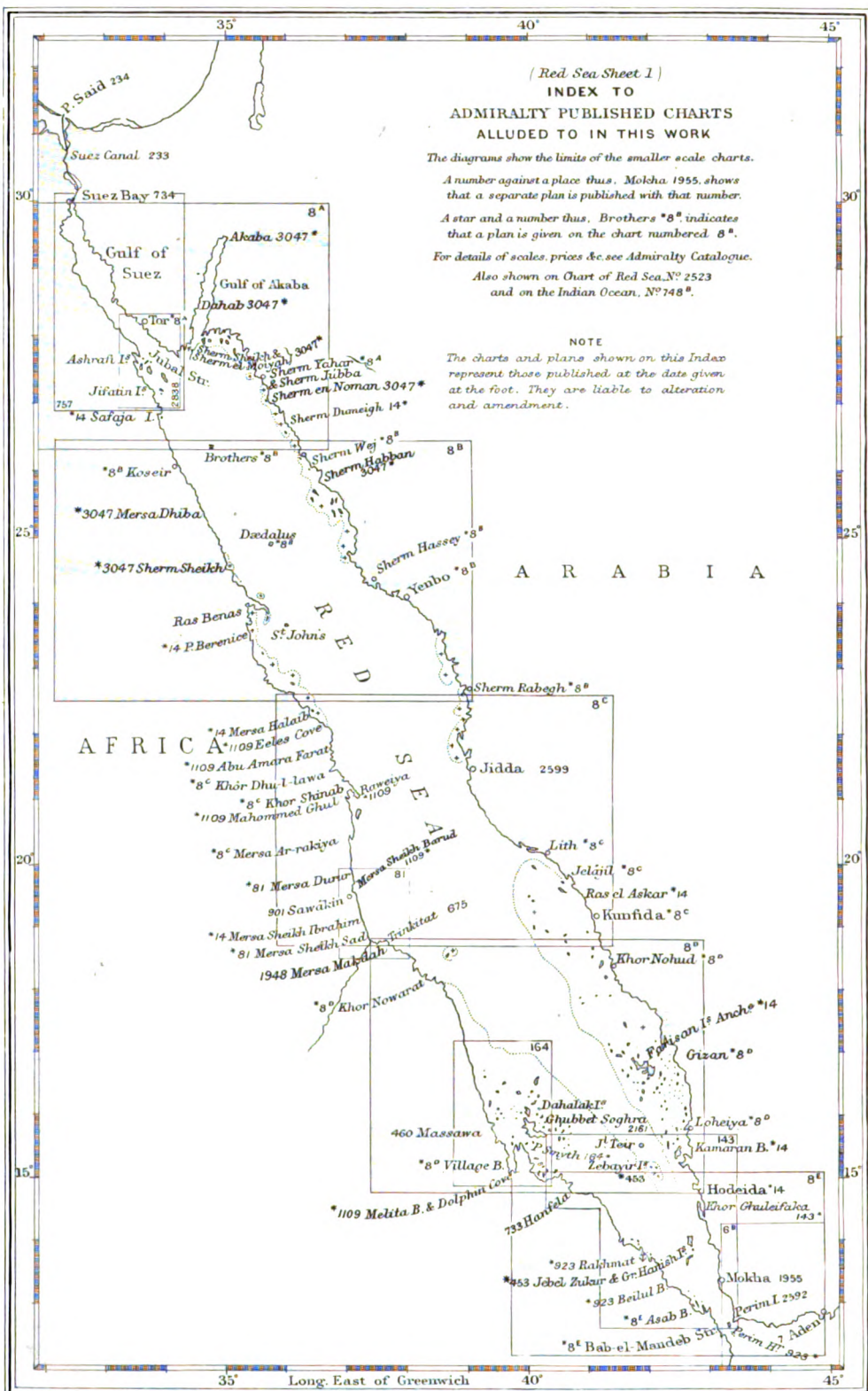
**IN THIS WORK THE BEARINGS ARE ALL MAGNETIC EXCEPT
WHERE MARKED AS TRUE.**

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF 60 TO A
DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO 100
FATHOMS.**

**THE SOUNDINGS ARE REDUCED TO LOW WATER OF
ORDINARY SPRING TIDES.**



THE RED SEA AND GULF OF ADEN PILOT.

CHAPTER I.

GENERAL REMARKS ON THE RED SEA AND GULF OF ADEN.—COMMUNICATION.—DOCKS AND REPAIRS.—COAL.—WINDS AND WEATHER.—CYCLONES.—TIDES.—CURRENTS. — BAROMETER. — TEMPERATURE. — CLIMATE.—NAVIGATION AND PASSAGES.

— GENERAL REMARKS. The Red Sea and Gulf of Aden Pilot

For later information respecting the lights which are described in this work, seamen should consult the Admiralty List of Lights, Parts V. and VI. These Light Lists are published early in the current year, corrected to the preceding 31st December.

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RED SEA.—This extensive inland sea lies between the parallels of 30° N. and 12° 40' N., and between the meridians 32° 20' E. and 43° 25' E. From Suez to cape Bab-el-Mandeb it is about 1,200 miles long in a S.S.E. direction; and its greatest breadth from shore to shore, at right angles to its axis, is in the southern part near Massawa, where it is 190 miles wide; its least breadth, in the strait of Bab-el-Mandeb, is 14 miles.

See chart, No. 2,523.

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GENERAL REMARKS.—The Red Sea and Gulf of Aden Pilot contains descriptions of the Suez canal, the Red sea, the gulf of Aden, including the island of Sokótra to the south-eastward, and the coast of Arabia as far eastward as the entrance of the gulf of Omán.

CHARTS.—The impetus given to the navigation of the Red sea as the great highway between West and East by the opening of the Suez canal has caused the value and amount of traffic to outrun the hydrographic knowledge desirable in so frequented a region. The mariner is, therefore, cautioned to use extra care when consulting the charts, bearing in mind that, though they are the best at present obtainable, many are constructed from old surveys conducted under great difficulties, and with appliances far inferior to those now in use. Every Admiralty chart bears on its face its date and history, and it may be assumed that those published from surveys made by Her Majesty's ships since the date of the opening of the Suez canal, or during the last thirty years, are fairly correct, whilst the accuracy of those of an earlier date should not be implicitly relied on. Also, that whilst every care has been taken to insure accuracy in the positions of reefs bordering on the central track, the maze of reefs lying between that track and the shore on either hand is as yet but roughly laid down.

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The northern part of this sea bifurcates; one branch, the gulf of Suez, has a general N.N.W. and S.S.E. direction throughout its length, which is about 170 miles; the other, the gulf of Akaba, has a N.N.E. direction and is about 97 miles long. On the promontory between these gulfs is the mountain group of Jebel Musa, which includes mounts Sinai and Horeb. No rivers discharge themselves into the Red sea, and the northern half of the region is in the rainless district.*

Coral reefs.—The Red sea, though, generally speaking, of considerable depth (in some places over 1,000 fathoms), is in parts studded with rocky islets and hidden coral banks, which extend far into the channel used by ships. They are more numerous in the southern than in the northern portion of the sea, the principal being the Farisan group, the Dahalak group, the Zebayir, and the Hanish islands.

The reefs in the Red sea are, perhaps, more numerous and extensive than in any other body of water of equal size. They extend most commonly in long strips parallel with the shore, with which they are in many cases united. The reefs themselves are not generally more than 5 feet below the surface, and on their outer edges are generally very steep-to.† Among the reefs unconnected with the shore, several are at some distance from it, but with channels between them and it of sufficient depth to admit of navigation by small vessels, and under their lee good anchorage may often be obtained in stormy weather. These reefs are more numerous on the eastern than on the western shore; but the Dahalak bank is, perhaps, more extensively intersected by them than any other part of this sea. There are also many isolated reefs, but they are not so formidable as might be supposed, in consequence of the transparency of the water, which admits of their being easily seen from aloft. They therefore offer no considerable obstacle to navigation, and the shelter afforded by some of them during strong head winds often renders them very useful.

The water outside the reefs, especially when moved by tidal currents or storms, is often of a milky appearance, caused by the coral sand then stirred up. This white water is frequently one of the signs of a shoal, but not always so, for some of the reefs show as dark green patches. This

* The specific gravity and temperature of the Red sea have a character of their own. The specific gravity is about 1030, against 1028 of the Mediterranean and 1026 of the Indian ocean, and the temperature, from 100 fathoms to the bottom, is from 69° to 70° Fahrenheit.

† In the gulf of Suez these reefs are generally only two or three feet below the surface, and in the summer, when the level of the sea is at its lowest, they occasionally uncover; the light green tint of the water on them makes them almost always plainly visible from the masthead, except with the sun ahead, or when the glassiness of the water in a dead calm prevents any reef being seen. With the slightest ripple, they always break on the weather side.

See chart, No. 2,523.

is the case at Jidda; and the precaution is then necessary of having the sun astern of the vessel, which, indeed, is the secret of successful navigation in all coral waters.

Central and Inner channels.—The existence of the islands and reefs just mentioned has led to a division of the Red sea into a central and two inshore channels. The central, and for all practical purposes only navigable channel used by full-powered steamers bound through the Red sea, lies between the outer extremes of the reefs extending from either shore, and has a depth of over 1,000 fathoms in the centre abreast of cape Elba, but shoals towards either end of the sea. The breadth of this channel in its widest part, near the Siyal islands, is about 110 miles; farther southward it diminishes to little more than 40 miles, and then gradually decreases in width as the strait of Bab-el-Mandeb is approached.

The inner channel on the Arabian side is formed partly by small detached reefs and sunken rocks, and partly by islands and long reefs. The average width of this inner channel is from 2 to 3 miles; the depth is considerable, and the anchorage, except in the places hereafter described, is so insecure as to afford but little protection from the sea. The inner channel on the western coast is similar in character to that on the eastern coast, but much narrower. The harbours, of which there are several, furnish fair anchorage; but it is unsafe to anchor on the rocky shelves projecting from the reefs. Both of these inshore channels are connected with the centre channels by openings in the reefs, some of which, especially those northward of latitude 17° N., are of great width.

Mountains.—The land adjacent to the Red sea, as well as to the gulf of Aden, is generally mountainous throughout its whole extent, though the high lands seldom abut on the shores, which latter are generally low and sandy; indeed, the Red sea may be considered as the lower part of a valley, bounded eastward by the high table-land of Arabia, and westward by a range of mountains rising from 4,000 to 6,000 feet above the sea. Between the high grounds and the shore a level district intervenes of some extent, but generally destitute of any vegetation. Nothing, it has been stated, can be conceived more wretched and degrading than the condition of the people dwelling in the villages bordering on the Red sea.

The Arabian or eastern shore of the Red sea consists of the Turkish provinces of Hedjaz in the North and Yemen in the South. Yemen is, perhaps, the most fertile part of Arabia. The western shores are under Egyptian dominion as far as Ras Kasar, the southern boundary of Nubia, in lat. $18^{\circ} 2\frac{1}{2}'$ N. A desert extends between the sea and the Nile valley. Territory geographically Abyssinian, as it abuts on the mountains of that country, commences in lat. 18° N., and continues southward beyond the entrance to the Red sea; practically, these coast lands belong to the several

native tribes inhabiting them, who have never submitted to any foreign authority except when temporarily compelled to do so by superior force, but Italy has by treaty assumed a protectorate over this part of the coast as far south as Ras Dumeira in lat. $12^{\circ} 43'$ N., and has formed settlements at Massawa, Asab, and one or two adjacent places. Southward of Ras Dumeira, France has a protectorate over the Red sea littoral.

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The northern part of this sea bifurcates; one branch, the gulf of Suez, has a general N.N.W. and S.S.E. direction throughout its length, which is about 170 miles; the other, the gulf of Akaba, has a N.N.E. direction and is about 97 miles long. On the promontory between these gulfs is the mountain group of Jebel Musa, which includes mounts Sinai and Horeb. No rivers discharge themselves into the Red sea, and the northern half of the region is in the rainless district.*

Coral reefs.—The Red sea, though, generally speaking, of considerable depth (in some places over 1,000 fathoms), is in parts studded with rocky islets and hidden coral banks, which extend far into the channel used by ships. They are more numerous in the southern than in the northern portion of the sea, the principal being the Farisan group, the Dahalak group, the Zebayir, and the Hanish islands.

The reefs in the Red sea are, perhaps, more numerous and extensive than in any other body of water of equal size. They extend most commonly in long strips parallel with the shore, with which they are in many cases united. The reefs themselves are not generally more than 5 feet below the surface, and on their outer edges are generally very steep-to.† Among the reefs unconnected with the shore, several are at some distance from it, but with channels between them and it of sufficient depth to admit of navigation by small vessels, and under their lee good anchorage may often be obtained in stormy weather. These reefs are more numerous on the eastern than on the western shore; but the Dahalak bank is, perhaps, more extensively intersected by them than any other part of this sea. There are also many isolated reefs, but they are not so formidable as might be supposed, in consequence of the transparency of the water, which admits of their being easily seen from aloft. They therefore offer no considerable obstacle to navigation, and the shelter afforded by some of them during strong head winds often renders them very useful.

The water outside the reefs, especially when moved by tidal currents or storms, is often of a milky appearance, caused by the coral sand then stirred up. This white water is frequently one of the signs of a shoal, but not always so, for some of the reefs show as dark green patches. This

* The specific gravity and temperature of the Red sea have a character of their own. The specific gravity is about 1030, against 1028 of the Mediterranean and 1026 of the Indian ocean, and the temperature, from 100 fathoms to the bottom, is from 69° to 70° Fahrenheit.

† In the gulf of Suez these reefs are generally only two or three feet below the surface, and in the summer, when the level of the sea is at its lowest, they occasionally uncover; the light green tint of the water on them makes them almost always plainly visible from the masthead, except with the sun ahead, or when the glassiness of the water in a dead calm prevents any reef being seen. With the slightest ripple, they always break on the weather side.

See chart, No. 2,523.

is the case at Jidda ; and the precaution is then necessary of having the sun astern of the vessel, which, indeed, is the secret of successful navigation in all coral waters.

Central and Inner channels.—The existence of the islands and reefs just mentioned has led to a division of the Red sea into a central and two inshore channels. The central, and for all practical purposes only^r navigable channel used by full-powered steamers bound through the Red sea, lies between the outer extremes of the reefs extending from either shore, and has a depth of over 1,000 fathoms in the centre abreast of cape Elba, but shoals towards either end of the sea. The breadth of this channel in its widest part, near the Siyal islands, is about 110 miles ; farther southward it diminishes to little more than 40 miles, and then gradually decreases in width as the strait of Bab-el-Mandeb is approached.

The inner channel on the Arabian side is formed partly by small detached reefs and sunken rocks, and partly by islands and long reefs. The average width of this inner channel is from 2 to 3 miles ; the depth is considerable, and the anchorage, except in the places hereafter described, is so insecure as to afford but little protection from the sea. The inner channel on the western coast is similar in character to that on the eastern coast, but much narrower. The harbours, of which there are several, furnish fair anchorage ; but it is unsafe to anchor on the rocky shelves projecting from the reefs. Both of these inshore channels are connected with the centre channels by openings in the reefs, some of which, especially those northward of latitude 17° N., are of great width.

Mountains.—The land adjacent to the Red sea, as well as to the gulf of Aden, is generally mountainous throughout its whole extent, though the high lands seldom abut on the shores, which latter are generally low and sandy ; indeed, the Red sea may be considered as the lower part of a valley, bounded eastward by the high table-land of Arabia, and westward by a range of mountains rising from 4,000 to 6,000 feet above the sea. Between the high grounds and the shore a level district intervenes of some extent, but generally destitute of any vegetation. Nothing, it has been stated, can be conceived more wretched and degrading than the condition of the people dwelling in the villages bordering on the Red sea.

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The foregoing remarks demonstrate that whilst the winds of the Red sea largely depend upon those of the gulf of Aden, these in turn are governed by the monsoon prevailing in the Arabian sea. This becomes the more apparent when, by the aid of the valuable information collated and compiled by the British Meteorological Office, we compare the prevailing winds of January and July, the former month being in the height of the North-east monsoon; the latter, of the South-west monsoon.

Thus, in January it is found that the northerly wind blows almost uninterruptedly from the gulf of Suez to about lat. 23° N. and continues as the prevailing wind to about 19° N.; farther southward, the south-easterly wind prevails. From lat. 23° N. to lat. 15° N. there is a mingling of the winds from the principal directions of North and South-east; and from lat. 18° N. to lat. 20° N. the winds from these directions are almost of equal frequency, (the belt of comparatively low barometer before referred to). In the gulf of Aden, the wind is at this time principally from the eastward, drawing more from the northward at the eastern end, and from the south-eastward at the western end. Calms are most frequent between lat. 20° N. and Aden, but they form a very small proportion of the observations recorded. The force of the wind is rather stronger with south-easterly than with northerly winds, and the strength of a moderate or fresh gale is frequently met with between lat. 20° N. and Perim.

In July, the wind is generally northerly or north-westerly over the whole of the Red sea, drawing more westerly in the southern part, whilst in the gulf of Aden the prevailing direction is westerly and south-westerly. The mean force of the wind is about the same throughout, but individual observations show that the force of a gale is only attained in the gulf of Suez and in the gulf of Aden; strongest in the latter. Calms are about twice as numerous as in January, and now form about fifteen per cent. of the total wind observations.

THE NORTH-EAST MONSOON commences in the Arabian sea about the middle of October, and prevails during the months of November, December, January, and February, after which the winds become light and variable until the setting in of the South-west monsoon.

The North-east monsoon blows as a steady moderate breeze from the north-eastward with fine settled clear weather and a moderately smooth sea.

THE SOUTH-WEST MONSOON commences in the Arabian sea about the middle or end of April and continues to the end of September, liable to a variation of from ten to fifteen days, being sometimes earlier, sometimes later, but is not felt in its full force until May or even June; it continues in full force during the months of June, July, and August, blowing stronger and steadier, and accompanied by a heavier sea in the open than on the coasts. Near the Hindustan coast, the wind is variable in direction, and blows in squalls, accompanied by heavy rain, mostly from northward of west. On the Sind coast, strong west-south-westerly winds set in about the beginning of April, causing a heavy swell; strong westerly winds blow at the same time westward of Ceylon, and north-westerly winds at the lower part of the Malabar coast.

On the eastern coast of Africa this wind blows very strongly from S.S.W. and continues with full force from that quarter through the channel between the island of Sokótra and Ras Asir, and from thence across the gulf of Aden to Ras Rehmat (which signifies in Arabic the cape of Wind's Death), a cape south-westward of Makalla. On this line, a vessel generally enters the monsoon when proceeding eastward from the Red sea.

LOCAL WINDS AND WEATHER.—Having given a general outline of the wind system affecting these seas, a more particular description of the winds as they affect different localities follows, premising that though heavy gales in the ordinary acceptation of the term are almost unknown either in the Red sea or gulf of Aden, yet strong winds, approaching the force of a full gale are not infrequent, especially in the gulf of Suez, in the southern part of the Red sea, and in the gulf of Aden.

Red sea.—Throughout the gulf of Suez, a hazy horizon is generally a sign of a breeze, but it is not always its precursor; the same remark applies to a light fleecy cloud hanging above the tops of the Tor or Sinai mountains, as seen from the southern entrance of the straits of Jubal. When the high lands are capped, or the weather is misty, continuous strong winds from the northward may be expected.

Between Suez and Jidda, northerly winds prevail all the year round, and, during the summer months, southward of Ras Abu-deraj, there is rarely a lull in them. From December to March inclusive these winds blow fiercely, moderating at full and change, with an occasional southerly moderate gale, foretold by damp weather and by a falling barometer;

during these months; westerly gales occur in the gulf of Suez and as far southward as the Dædalus reef, accompanied at times by dense fogs of dust; violent north-easterly winds on the Arabian coast near Jidda are also felt. During the winter months, as previously remarked, calms are of but short duration.

In fine weather and near the shore, land and sea breezes are common throughout the Red sea, but especially in the southern half, the sea breezes at times blowing with considerable strength.

In the southern part of the Red sea, between the strait of Bab-el-Mandeb and the parallel of 17° N., as before explained, southerly winds are experienced in the central track from October to May, prevailing from November to April, often blowing strongly from the south-eastward. About December, these winds bring hazy weather with squalls and rain. After February, their strength becomes more uncertain and they may be broken by northerly winds, but, not infrequently, the strong southerly winds last into May. A heavy but short sea is raised by these winds.

During March, April, and May, the period of the breaking up of the North-east monsoon in the Arabian sea and before the South-west monsoon is thoroughly established, the weather is unsettled, with easterly squalls, occasionally rain, and sometimes sand-storms. The fine impalpable dust filling the air in these storms is very distressing to sight and breathing whilst they last, and, at times, they are dangerous to navigation from the sudden obscurity they occasion. Commander Aldrich, H.M. surveying vessel *Fawn*, gives the following description of a sand-storm experienced on the 14th May, 1881, which may be taken as a fair sample of many described by other officers:—"The weather during the early part of the day had been fine, with a light southerly wind and cloudy sky. At 2 p.m. a heavy bank of cloud came up from the South and soon overspread the sky; the wind fell calm. An hour and a half afterwards, a yellowish cloud approached from the eastward and the wind springing up from E. by S. freshened almost immediately to a strong breeze. The cloud proved to be a sand-storm, and by 4 h. p.m. every object more than one hundred yards distant was obscured, but the sky overhead remained clear. The storm lasted until 5 h. p.m., during which time the wind shifted to E.S.E. and N.E. and fell light."

The north-westerly winds, in the southern part of the Red sea, commence in June, seldom blow with any strength, and become light and variable in August and September, with occasional southerly winds, long calms, and hazy weather in the latter month.

Near the shores of this region, land and sea breezes are experienced, the latter sometimes of considerable strength, and northerly winds are common all the year round until southward of Massawa.

Squalls come off the land with hazy weather between April and June; while in July, August, and September, the winds are usually light and variable, with frequent long calms.

The southerly winds in the southern portion of the sea blow with less strength on the western than on the eastern coast.

During the winter months, throughout the Red sea, northerly winds are generally accompanied by dry, and southerly winds by a damp atmosphere. A change of wind is thus often indicated some hours before it takes place, and before any other sign is visible.

During the summer months, the atmosphere is generally damp throughout the Red sea but the sky overhead is clear. *See* p. 26.

The North-east monsoon of the Indian ocean blowing home becomes, as before stated, a south-easterly wind in the southern part of the Red sea. Vessels, however, in proceeding southward during the winter months usually find, on leaving the strait of Bab-el-Mandeb, that, although they still have a head wind to contend with, it is much diminished in strength.

Gulf of Aden.—Within the gulf of Aden, that is, between the meridians of Ras Asir and Bab-el-Mandeb, the winds during the South-west monsoon season, are very variable; as a general rule, they are freshest by day and lightest by night. About the end of April, before the monsoon has regularly set in, they vary from E.N.E. to S.E. and South with clear weather, but hazy weather is sometimes experienced; close in-shore, land winds are occasionally felt from 4 h. to 8 h. a.m. June is a very unsettled month, the wind uncertain, weather at times clear, but generally hazy; in the morning, it is either calm or there are very light airs which sometimes increase towards noon to a fresh breeze from the southward, occasioning a long swell on the Arabian shore. Towards the middle of the month, and in July and August, between the strait of Bab-el-Mandeb and Burnt island, strong westerly or south-westerly winds may be expected; these blow out of the Red Sea as a north-westerly wind, sometimes, as previously stated, enabling a vessel bound eastward to reach the monsoon in the Arabian sea; but, as a general rule, she will lose the wind before reaching Ras Behmat, and will not fall in with it again until it bursts from the southward through the channel between Sokotra and the mainland of Africa.

Moderate southerly winds may also be expected during these months, blowing only during the day and declining to a light air at night. On the Arabian coast, after the southerly wind dies away in the evening, severe land squalls are not infrequent, which rising in a thick cloud of dust, especially where the coast is low, give ample warning to the seaman. There is always a long southerly swell on the Arabian shore at this season.

Near the coast of Africa, from Ras Asir westward, at this season, heavy land squalls are experienced from about S.S.W.; they generally come off between midnight and daybreak, lasting about an hour, are frequently followed by a calm, and as frequently, by a westerly or west-south-westerly breeze. These land winds are always parchingly hot and very disagreeable.

In September, the westerly winds cease and land and sea breezes prevail, as also in the month of October. The nights are calm and sultry.

Early in November the North-east monsoon commences in the gulf of Aden, and in the steadiness of wind and weather offers a striking contrast to the period of the South-west monsoon. The prevailing winds are now between E.N.E. and East drawing to S.E. as the entrance to the Red sea is approached, and it blows fresh at times. Towards the end of December and early in January, it frequently blows with the force of a moderate gale, accompanied by heavy rain. Throughout the remainder of January, February, and March, easterly and east-north-easterly winds prevail, increasing in strength as the strait of Bab-el-Mandeb is neared. The weather is generally clear, cool, and agreeable; rain may sometimes fall, but not in any great quantity. These are the three principal months for local trade.

Ras Asir, Sokótra, &c.—The South-west monsoon blows with great force through the passage between Ras Asir and the island of Sokótra, with thick hazy weather; the North-east monsoon with much less force, and the weather is generally fine and clear.

On the northern side of Sokótra, during June, July, and August, the height of the South-west monsoon, the wind, according to native report, blows in hard and violent gusts, whilst on the southern side it is steadier and not so strong, but there is a tremendous surf on the shore. Occasional showers of rain also fall at this season. In September, October, and November, light land and sea breezes occur, and the wind has a tendency to become more steady from the northward towards the latter part of that time. From November to January, the prevailing wind is N.N.E., and as it blows in violent gusts for several days at a time, the northern side of the island then becomes a dangerous coast to be near. From February to May is the fine season, when the anchorages on the northern coast are considered to be safe.

South-east coast of Arabia.—On this coast, from Kosair to Ras Al-Hadd, the South-west monsoon sets in late in May and ceases towards the end of August; the sea is not usually so heavy as that experienced in the open or near the western coast of India, and the sky is generally clear, but the weather hazy. Southerly winds frequently set in early in March and blow very fresh; these must not be mistaken for the

monsoon, as they are followed at the end of that month and in April by light and variable winds along the whole line of coast. May is a doubtful month.

In the vicinity of Khorya Morya bay and islands, the South-west monsoon is reported by the natives to set in with a gale of wind, thunder, lightning, and rain.

The South-west monsoon is in its full force from June until towards the latter end of August ; it blows strongest, and the sea is heaviest, on that part of the coast between Ras Merbat and Masira island, especially in Khorya Morya bay, and particularly in the month of July. During these months, the ordinary Arab traders do not venture to sea ; the larger boats run up the coast early in June, after the first burst of the monsoon, and also towards the latter end of August, when they consider the monsoon to be over. Slave dhows, however, frequently run through the strength of the monsoon.

In the month of September, the winds are moderate from the westward and southward. In October, light variable breezes and calms prevail ; in-shore, land and sea breezes are sometimes experienced, and occasionally, at night, a passing shower of rain. As a general rule, rain seldom falls on this coast, except in the province of Dhofar and in the gulf of Aden ; but heavy dews may always be expected. The atmosphere in the South-west monsoon is generally very hazy, and the land consequently not visible until quite close, rendering it necessary to pay great attention to the lead.

On this part of the Arabian coast, light and variable winds are experienced during the month of October. In November, between the island of Masira and Ras Al-Hadd, light land winds of short duration, and sea breezes from S.E. to South, generally prevail ; but southward and westward of Masira, land winds are rare. A strong breeze from N.E., with a short chopping sea, is by no means unusual during this month and early in December, and is always looked for by the native navigators.

During the months of December, January, February, and part of March, the North-east monsoon blows along the whole line of coast varying with the direction of the coast line. At a distance from the coast, it blows from N.E. to E. by S., with clear pleasant weather, and free from squalls and rain ; but, near the shore, the atmosphere is generally hazy, particularly when land winds are blowing. Fogs are also prevalent in the vicinity of Ghubbet Hashish and the gulf of Masira.

Belats.—Between Ras Sakar and the island of Masira, the strong land winds known as Belats may be expected from the middle of December until the middle of March ; they blow from North to N.N.W. and last from one to three days, and at times even as long as seven days. Indication of their approach is generally given by a faint hazy arch over the land the previous evening, or by the wind shifting towards the land, sometimes

obliterated, and northerly winds of variable strength prevail throughout the whole length of the Red sea, with but little interruption; whilst southward and eastward of the strait of Bab-el-Mandeb through the gulf of Aden, variable winds are found during the early part of this monsoon; but, from June to September, steady westerly winds prevail, blowing strongly at times out of the Red sea and through the gulf, occasionally as far as Sokótra and into the strength of the South-west monsoon in the open sea. At this season, therefore, a ship may expect a fair wind the whole distance from the gulf of Suez to the Arabian sea.

The foregoing remarks demonstrate that whilst the winds of the Red sea largely depend upon those of the gulf of Aden, these in turn are governed by the monsoon prevailing in the Arabian sea. This becomes the more apparent when, by the aid of the valuable information collated and compiled by the British Meteorological Office, we compare the prevailing winds of January and July, the former month being in the height of the North-east monsoon; the latter, of the South-west monsoon.

Thus, in January it is found that the northerly wind blows almost uninterruptedly from the gulf of Suez to about lat. 23° N. and continues as the prevailing wind to about 19° N.; farther southward, the south-easterly wind prevails. From lat. 23° N. to lat. 15° N. there is a mingling of the winds from the principal directions of North and South-east; and from lat. 18° N. to lat. 20° N. the winds from these directions are almost of equal frequency, (the belt of comparatively low barometer before referred to). In the gulf of Aden, the wind is at this time principally from the eastward, drawing more from the northward at the eastern end, and from the south-eastward at the western end. Calms are most frequent between lat. 20° N. and Aden, but they form a very small proportion of the observations recorded. The force of the wind is rather stronger with south-easterly than with northerly winds, and the strength of a moderate or fresh gale is frequently met with between lat. 20° N. and Perim.

In July, the wind is generally northerly or north-westerly over the whole of the Red sea, drawing more westerly in the southern part, whilst in the gulf of Aden the prevailing direction is westerly and south-westerly. The mean force of the wind is about the same throughout, but individual observations show that the force of a gale is only attained in the gulf of Suez and in the gulf of Aden; strongest in the latter. Calms are about twice as numerous as in January, and now form about fifteen per cent. of the total wind observations.

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In the southern part of the Red sea, between the strait of Bab-el-Mandeb and the parallel of 17° N., as before explained, southerly winds are experienced in the central track from October to May, prevailing from November to April, often blowing strongly from the south-eastward. About December, these winds bring hazy weather with squalls and rain. After February, their strength becomes more uncertain and they may be broken by northerly winds, but, not infrequently, the strong southerly winds last into May. A heavy but short sea is raised by these winds.

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Near the shores of this region, land and sea breezes are experienced, the latter sometimes of considerable strength, and northerly winds are common all the year round until southward of Massawa.

Squalls come off the land with hazy weather between April and June; while in July, August, and September, the winds are usually light and variable, with frequent long calms.

The southerly winds in the southern portion of the sea blow with less strength on the western than on the eastern coast.

During the winter months, throughout the Red sea, northerly winds are generally accompanied by dry, and southerly winds by a damp atmosphere. A change of wind is thus often indicated some hours before it takes place, and before any other sign is visible.

During the summer months, the atmosphere is generally damp throughout the Red sea but the sky overhead is clear. See p. 26.

The North-east monsoon of the Indian ocean blowing home becomes, as before stated, a south-easterly wind in the southern part of the Red sea. Vessels, however, in proceeding southward during the winter months usually find, on leaving the strait of Bab-el-Mandeb, that, although they still have a head wind to contend with, it is much diminished in strength.

Gulf of Aden.—Within the gulf of Aden, that is, between the meridians of Ras Asir and Bab-el-Mandeb, the winds during the South-west monsoon season, are very variable; as a general rule, they are freshest by day and lightest by night. About the end of April, before the monsoon has regularly set in, they vary from E.N.E. to S.E. and South with clear weather, but hazy weather is sometimes experienced; close in-shore, land winds are occasionally felt from 4 h. to 8 h. a.m. June is a very unsettled month, the wind uncertain, weather at times clear, but generally hazy; in the morning, it is either calm or there are very light airs which sometimes increase towards noon to a fresh breeze from the southward, occasioning a long swell on the Arabian shore. Towards the middle of the month, and in July and August, between the strait of Bab-el-Mandeb and Burnt island, strong westerly or south-westerly winds may be expected; these blow out of the Red Sea as a north-westerly wind, sometimes, as previously stated, enabling a vessel bound eastward to reach the monsoon in the Arabian sea; but, as a general rule, she will lose the wind before reaching Ras Rehmat, and will not fall in with it again until it bursts from the southward through the channel between Sokótra and the mainland of Africa.

Moderate southerly winds may also be expected during these months, blowing only during the day and declining to a light air at night. On the Arabian coast, after the southerly wind dies away in the evening, severe land squalls are not infrequent, which rising in a thick cloud of dust, especially where the coast is low, give ample warning to the seaman. There is always a long southerly swell on the Arabian shore at this season.

Near the coast of Africa, from Ras Asir westward, at this season, heavy land squalls are experienced from about S.S.W.; they generally come off between midnight and daybreak, lasting about an hour, are frequently followed by a calm, and as frequently, by a westerly or west-south-westerly breeze. These land winds are always parchingly hot and very disagreeable.

In September, the westerly winds cease and land and sea breezes prevail, as also in the month of October. The nights are calm and sultry.

Early in November the North-east monsoon commences in the gulf of Aden, and in the steadiness of wind and weather offers a striking contrast to the period of the South-west monsoon. The prevailing winds are now between E.N.E. and East drawing to S.E. as the entrance to the Red sea is approached, and it blows fresh at times. Towards the end of December and early in January, it frequently blows with the force of a moderate gale, accompanied by heavy rain. Throughout the remainder of January, February, and March, easterly and east-north-easterly winds prevail, increasing in strength as the strait of Bab-el-Mandeb is neared. The weather is generally clear, cool, and agreeable; rain may sometimes fall, but not in any great quantity. These are the three principal months for local trade.

Ras Asir, Sokótra, &c.—The South-west monsoon blows with great force through the passage between Ras Asir and the island of Sokótra, with thick hazy weather; the North-east monsoon with much less force, and the weather is generally fine and clear.

On the northern side of Sokótra, during June, July, and August, the height of the South-west monsoon, the wind, according to native report, blows in hard and violent gusts, whilst on the southern side it is steadier and not so strong, but there is a tremendous surf on the shore. Occasional showers of rain also fall at this season. In September, October, and November, light land and sea breezes occur, and the wind has a tendency to become more steady from the northward towards the latter part of that time. From November to January, the prevailing wind is N.N.E., and as it blows in violent gusts for several days at a time, the northern side of the island then becomes a dangerous coast to be near. From February to May is the fine season, when the anchorages on the northern coast are considered to be safe.

South-east coast of Arabia.—On this coast, from Kosair to Ras Al-Hadd, the South-west monsoon sets in late in May and ceases towards the end of August; the sea is not usually so heavy as that experienced in the open or near the western coast of India, and the sky is generally clear, but the weather hazy. Southerly winds frequently set in early in March and blow very fresh; these must not be mistaken for the

monsoon, as they are followed at the end of that month and in April by light and variable winds along the whole line of coast. May is a doubtful month.

In the vicinity of Khorya Morya bay and islands, the South-west monsoon is reported by the natives to set in with a gale of wind, thunder, lightning, and rain.

The South-west monsoon is in its full force from June until towards the latter end of August; it blows strongest, and the sea is heaviest, on that part of the coast between Ras Merbat and Masira island, especially in Khorya Morya bay, and particularly in the month of July. During these months, the ordinary Arab traders do not venture to sea; the larger boats run up the coast early in June, after the first burst of the monsoon, and also towards the latter end of August, when they consider the monsoon to be over. Slave dhows, however, frequently run through the strength of the monsoon.

In the month of September, the winds are moderate from the westward and southward. In October, light variable breezes and calms prevail; in-shore, land and sea breezes are sometimes experienced, and occasionally, at night, a passing shower of rain. As a general rule, rain seldom falls on this coast, except in the province of Dhofar and in the gulf of Aden; but heavy dews may always be expected. The atmosphere in the South-west monsoon is generally very hazy, and the land consequently not visible until quite close, rendering it necessary to pay great attention to the lead.

On this part of the Arabian coast, light and variable winds are experienced during the month of October. In November, between the island of Masira and Ras Al-Hadd, light land winds of short duration, and sea breezes from S.E. to South, generally prevail; but southward and westward of Masira, land winds are rare. A strong breeze from N.E., with a short chopping sea, is by no means unusual during this month and early in December, and is always looked for by the native navigators.

During the months of December, January, February, and part of March, the North-east monsoon blows along the whole line of coast varying with the direction of the coast line. At a distance from the coast, it blows from N.E. to E. by S., with clear pleasant weather, and free from squalls and rain; but, near the shore, the atmosphere is generally hazy, particularly when land winds are blowing. Fogs are also prevalent in the vicinity of Ghubbet Hashish and the gulf of Masira.

Belats.—Between Ras Sakar and the island of Masira, the strong land winds known as Belats may be expected from the middle of December until the middle of March; they blow from North to N.N.W. and last from one to three days, and at times even as long as seven days. Indication of their approach is generally given by a faint hazy arch over the land the previous evening, or by the wind shifting towards the land, sometimes

in sudden gusts, early in the night. The commencement of the Belat is frequently accompanied by a dense sand-storm, especially when near the shore. This presents all the appearance of a thunderstorm, but the colour of the cloud is a dark red.

Belats nearly always set in between midnight and 4 h. a.m., commencing with a light breeze and increasing to a moderate gale in about an hour, blowing hardest on the succeeding days between 9 p.m. and 9 a.m.; they usually cease about noon as suddenly as they commenced.

These squalls are very dangerous to sailing vessels close in-shore, as during the night they occasionally die away to a calm of about an hour's duration, and are succeeded by heavy gusts from the mountains, at intervals of a few minutes for five or six hours. These gusts, like "white squalls" in the Mediterranean or the Willie Waws of Magellan strait, give no warning, except the noise they make in passing over the water, and, are sufficiently strong to dismast a vessel which has not shortened sail. Off-shore, a high sea is raised by these winds. In some years they are rare, while in others they are frequent and very violent. Belats are often succeeded by strong south-easterly winds, causing a considerable swell.

The winds and weather in the bay of Khorya Morya appear to be more boisterous and variable than on any other part of this coast; the Belats are more furious, and gales from S.S.W. are common during the months of February and March; the changes of wind are sudden and give little or no warning. The atmosphere is always hazy during the Belats.

About Masira, south-easterly winds are more prevalent than any others in February and March, varied occasionally by a moderate north-easter. Fresh southerly breezes of two or three days' duration may be experienced occasionally in the gulf of Masira.

From the middle of March to the end of April, the winds are light and variable along the whole coast; land and sea breezes are felt in-shore. From about the gulf of Masira to Ras Al-Hadd, north-easterly winds become lighter, and south-easterly and south-westerly winds more frequent.

Too much confidence must not, however, be placed on the probable direction of winds in the neighbourhood of Masira, for experience proves that the seasons are anything but regular, and frequently, in the same month, in different years, totally opposite winds are experienced.

CYCLONES.—Though moderate gales, as previously described, are not uncommon, hurricanes or cyclones are happily almost unknown either in the Red sea or in the gulf of Aden, and are of but rare occurrence in the Arabian sea; most of those of which there is any record having been chiefly confined to the western coast of India. There are, however, a few exceptions.

In April, 1847, a furious cyclone occurred on the western coast of India, sweeping the whole coast as far northward as Bombay, and causing a considerable amount of damage to shipping. At the same time, or within two days of its passing over Bombay, Maskat, northward of Ras Al-Hadd, was visited by a similar tempest of a very violent nature, partaking of all the features of a cyclone; it caused great damage to the shipping in the cove, driving several vessels on the rocks; the town also suffered severely. This cyclone gave no warning of its approach, beyond the clouds being tinged with red at sunset, and a closeness in the atmosphere, nor did the barometer fall to any great extent.

In April, 1856, the P. and O. Co.'s steamer *Malta* and the ship *Haddington* suffered much during a violent hurricane southward of Khorya Morya bay, and the E. I. Co.'s steamer *Queen* was nearly lost at the same time.

Between June 1st-3rd, 1885, a cyclone traversed the whole length of the gulf of Aden on an almost due west course. Its centre appears to have passed over the northern part of Sokotra at about noon of the 1st, being met with at about 50 miles northward of Ras Asir, at midnight, by the French vessel of war *Le Fabert*. Its track from thence, westward, appears to have been about the middle of the gulf, passing some 50 miles southward of Aden at about 3h. p.m. on the 3rd June; from thence towards the gulf of Tajura, passing southward of Obokh about 9 h. p.m.; the progress of the cyclone from Ras Asir was thus about 10 miles an hour. The wind was from N.E. to East over the whole northern portion of the gulf, and at Aden between the hours of noon and 3 h. p.m. the velocity was registered from 90 to 50 miles an hour; $2\frac{1}{4}$ inches of rain fell on that day. At Obokh, the wind was fitful on the 3rd, settling at East about 4 h. p.m. with continuous rain, shifting to South, at 9 h. p.m. and then to S.W.

In the gulf of Aden, the sea near the path of the storm was terrific. The steam-ship *Inchulva*, of Liverpool, experienced the full force of this cyclone about 60 miles south-eastward of Aden and narrowly escaped foundering. This vessel passed the islands of the Red sea on the 1st June, when the storm had not yet reached cape Guardafui, and had light variable airs with hot sultry weather and a smooth sea. The barometer began to fall slightly on the 2nd, when the centre of the cyclone was yet 450 miles distant, but no rapid fall set in until 8.30 a.m. on the 3rd, only three hours before the centre passed close to the ship; the lowest reading was 28.10 inches, during the height of the storm. The French vessel of war *Renard* left Obokh about 4 or 5 hours before the storm reached that place, and foundered; the German vessel of war *Augusta* also foundered near Aden, and many other steamers and small vessels disappeared.

This cyclone was preceded by the usual threatening appearance of weather; by thunder, continuous lightning, and heavy rain; and in some cases, but not always, by a falling, and even very low, barometer. At Aden the barometer gave little or no warning, but an unusual swell set into the bay without any apparent cause. Near Perim these threatening appearances, with a halo round the moon and uneasiness among the sea birds, but with no barometrical disturbance, were observed on the 1st of June, nearly two days before the cyclone reached that neighbourhood.

A hurricane was experienced in the gulf of Aden on October 14th and 15th, 1896, during which a British steamer was seen to founder, and the ss. *Juna* from Zeila to Bulhar was lost with all hands. This cyclone was met with by the P. and O. steam-vessel *Victoria* about 120 miles north of Sokótra, and by the P. and O. ss. *Ballarat*, which left Aden on the 13th, and felt its full force the next morning in about lat. 12° N., long. 47° E., the wind from 3 a.m. to 5 a.m. being registered at 11 of Beaufort's scale.

On June 2nd, 1898, a cyclonic storm of considerable strength, which had advanced from the southward, was experienced by several vessels in the Arabian sea, the centre of which storm on that day was probably in about lat. 17° N., long. 58° E. In the storm area winds of force 8 to 10 were experienced, with squalls of hurricane power, torrential rain, thunder and lightning, and a dangerous sea. The disturbance continued to advance northward or north-north-westwards, and on June 3rd the centre lay apparently near and to the west of Mascat, at which place much destruction was caused. The storm was also most severely felt at Jashk and on the Makran coast, considerable damage being done at the former place.

These storms, though rare, are the more dangerous in these regions from the difficulty of prognosticating their approach with any degree of certainty; the usual signs of approaching stormy weather should, however, never be neglected, especially at those seasons when cyclones are most likely to be experienced, viz., at the change of the monsoons.

PRACTICAL RULES FOR SEAMEN IN TROPICAL CYCLONES, NORTH OF THE EQUATOR.

When in the region, and in the season of revolving storms, be on the watch for the premonitory signs. *Constantly and carefully observe and record the barometer.*

When there are indications of a cyclone being near, heave-to on the starboard tack, and carefully observe and record the changes of the barometer and wind, so as to find the bearing of the centre, and ascertain by the shift of wind in which circle the vessel is situated. Much will often depend upon heaving-to in time.

To find the bearing of the centre. Face the wind, then the centre of the storm will be from 12 to 8 points to the right; when the storm is distant it will be from 10 to 12 points; and when the barometer has fallen five or six-tenths it will be about 8 points.

To find on which semicircle the vessel is situated.—If, in the northern hemisphere, the wind shifts to the right, the vessel will be in the right-hand or dangerous semicircle with regard to the direction in which the storm is travelling, in which case the vessel should be kept on the starboard tack and increase her distance if possible from the centre. If the wind shifts to the left, the vessel will be on the left or safe semicircle; the helm should be put up and the vessel run with the wind on the starboard quarter until the barometer rises, when the vessel may be hove-to on the port tack at once. Should the wind remain steady and the barometer continue to fall, the vessel is in the path of the storm, and should run with the wind on the starboard quarter into the safe semicircle.

In all cases act so as to increase as soon as possible the distance from the centre; bearing in mind that the whole storm-field is advancing.

In receding from the centre of a typhoon, the barometer will rise and the wind and sea subside.—See the Barometer Annual for full details.

TIDES.—Red sea.—In the gulf of Suez a tidal influence is felt; and although the times of high and low water on the shore at many places differ from the times of the turning of the streams in the offing, the following general rule, derived from observations made by the officers of H.M. surveying vessel *Newport* in 1872, is easily remembered:—When the water is rising at Suez, the stream, throughout the whole length of the gulf, runs to the northward, and, when falling, to the southward. Both streams set fairly in mid-channel, with a maximum rate at springs of $1\frac{1}{2}$ miles, and at neaps of half a mile an hour, except in the vicinity of Ras Abu-deraj, Ras Sheratib, and Ashrafi islands, where the direction is uncertain.

In the strait of Jubal, at the southern end of the gulf of Suez, the tidal streams run at from $1\frac{1}{2}$ to 2 knots an hour in mid-channel, but within a distance of 2 miles from the reefs their direction is uncertain. In the immediate neighbourhood of any of the large reefs, the rising tide sets towards the reef and the falling tide away from it. Between Ashrafi and Shab Ali, the tide runs to the northward longer than to the southward. When the tide is against the wind it causes a troubled sea.*

In the portion of the gulf northward of Tor, high water occurs nearly at the same time as at Suez, the rise of tide increasing from $1\frac{1}{2}$ feet at Ras

* On the northern side of Abu Nahas reef, strong under currents were noticed by those employed in recovering treasure from the wreck of the steamer *Carnatic*, which vessel was lost in the year 1869.

Gharib to 7 feet at Suez. It is high water in the southern portion of the gulf when it is about low water at Suez, and vice versâ.

There is a tidal rise and fall of one foot nine inches at Ashrafi, and of 2 feet at the Brothers, more than 100 miles farther south-eastward; but there is a rise of only one foot three inches at Tor, and there appears to be none at cape Zeiti, though at both these places there is a daily range in the height of the water, depending on the strength of the wind, of from 6 inches to 2 feet. The water is highest early in the morning and lowest in the evening.

Along the shores of the Red sea a rise and fall of tide has been observed in some places, and in some of the narrowest channels a tidal stream seems to flow; but at other parts, until the strait of Bab-el-Mandeb is neared, it is imperceptible. Here, however, the tides of the gulf of Aden begin to make themselves felt, so that at Jebel Zukur there is a rise of $2\frac{1}{2}$ feet at springs, and of 7 feet at Perim.

Variation of sea level.—In the Red sea, however, besides the tidal rise and fall, there is a distinct and marked alteration in the level of the waters, amounting to 2 or 3 feet, and dependent upon the season. On this subject, Captain S. B. Haines, Indian navy, remarks as follows* :—“It is an established fact that the water is raised to a higher level in the northern parts of the Red sea during December, January, February, and March, from the force of the strong southerly winds that then blow up that sea; and that in July, August, and September, it is lower by 2 or even 3 feet, from the force of the strong N.N.W. winds blowing down towards the strait. This fact is proved by the *Dædalus* shoal, which, though situated in the middle of the sea, is at one time sufficiently dry to have a tent pitched upon it, and at another season is covered with water.”

At Sawâkin, Jidda, and other places, the same difference of level occurs, due to alternating northerly and southerly winds, the southerly wind producing the higher level. It has also been observed that during the summer months the reefs in the strait of Jubal and in the vicinity of Zafarana point occasionally uncover at low water; at all other times they remain covered. This difference of level, dependent upon the season, though not large, is interesting both as a scientific and as a practical question.

At Port Thewfik the mean sea level is about a foot higher during the winter months (November to April) than during the summer months (May to October). The identity of the mean sea levels at Suez and Port Said is established. The extreme difference caused by contrary winds observed at Suez is 8 feet 6 inches, and at Port Said 4 feet 6 inches.

* Journal of Royal Geographical Society 1845, vol. 15, p. 150.

Gulf of Aden.—On the northern shore of the gulf of Aden between Perim and the Khorya Morya islands, the rise of tide at springs is from $6\frac{1}{2}$ to $7\frac{1}{4}$ feet; farther eastward the rise increases, and is about 10 feet at the gulf of Masira. On the western and southern shores, it varies from 8 to $9\frac{1}{4}$ feet at Zeila to $8\frac{1}{2}$ feet at Berbera, and 6 feet at Ras Alula and Ras Asir.

The tidal wave strikes the whole length of the southern shore of Arabia in a very short interval of time. At full and change, the time of high water on this shore is from 9 h. to 10 h., whilst at Perim it is about 8h.

The tidal streams in the gulf of Aden are irregular and weak, and are frequently overcome by the current. From as far eastward as Merbat, in long. $54^{\circ} 45' E.$, the flood stream sets south-westward. Beyond Merbat, the flood stream sets north-eastward towards Ras Al-Hadd.

CURRENTS.—General.—The general drift of the current in the Red sea and gulf of Aden is dependent upon the monsoon season prevailing in the Arabian sea. Thus:—In January, the height of the North-east monsoon, the general drift is westward in the gulf of Aden, and N.N.W. in the Red sea. The strength of this general drift is very slight; nowhere in the open does it exceed one knot, and generally it is less than half a knot an hour.

In July, during the South-west monsoon season, any general current in the Red sea is hardly perceptible; there appears to be, however, a tendency to a S.S.E. set between the parallels of $20^{\circ} N.$ and $17^{\circ} N.$, and there is also some evidence of a very weak northerly set in the northern part of the district. On approaching Perim, the current sets from the Red sea into the gulf of Aden; whilst, in that gulf, a strong easterly current is manifested on the Arabian side, and a somewhat weaker westerly current on the African side.

RED SEA.—Local currents.—These currents in the Red sea, south of the strait of Jubal, are irregular: they are probably caused chiefly by, and at first set with, the prevailing winds. After a long continuance of winds in the same direction, however, they are often found setting against them. This is particularly the case on the Arabian coast, where, after a north-westerly breeze of some duration has fallen light, a strong current runs to the northward. On the Egyptian coast, from November to March, the strong northerly and north-easterly winds which sometimes prevail at that season cause a strong current to the westward, but on the wind falling light it sets in the reverse direction. The Arabian coast, between Jidda and Ras Muhammed, is therefore the best to work to windward upon, as in addition to a sometimes favourable current, the land and sea breezes are more to be relied on.

With strong south-easterly winds, a northerly current of from half a knot to one knot is generally experienced between Ras Beilul and Great Hanish, but Commander Hoskyn's experience in H.M.S. *Myrmidon*, 1885, led him to believe that the current runs stronger between Great Hanish and the Haycocks than between the Haycocks and Ras Beilul; also, that a much more turbulent sea will be found between Great Hanish and the Haycocks than farther southward. On several occasions, with a strong north-westerly current running in the offing, a southerly set was experienced along the western shores of Jebel Zukur and Great Hanish islands.

Caution.—Cross currents.—Strong currents occasionally set across the Red sea, so that a good berth should be given to all outlying reefs and shoals; this is the more necessary as the strength of these currents increases rapidly as the shoals are neared. They form one of the chief obstacles to the safe navigation of the Red sea, and to them is to be attributed the loss of several steamers during recent years. The knowledge of their existence should impress the mariner with the necessity of constant vigilance to counteract their effects.

The necessity of being particularly on guard against these cross-currents in the Red sea should make the seaman endeavour to obtain the position of his vessel by twilight stars in the morning and evening; as there is reason to believe the observations then are not so liable to error from refraction of the horizon as during the day.

In the middle of the central channel the rate of these cross-currents seldom exceeds 20 miles a day. They are met with at all parts of the sea, but are especially dangerous to vessels approaching the gulf of Suez from the southward, when nearing the entrance to that gulf. Also, in proceeding to the southward, from the vicinity of the Sawákin group until Jebel Zukur is passed, the greatest caution is required. No fixed law can be given for them, as they are often experienced without any apparent cause; but it appears that during the prevalence of the strong wind blowing into the Red sea from the southward, an easterly set is most frequently experienced, and its rate may be from half a knot to $1\frac{1}{2}$ knots per hour.

One great cause for watchfulness as to the effect of cross-currents arises from the fact that when they set strongly across the sea, either eastward or westward, at one part, it by no means follows that the space under the influence of this current is of great extent; on the contrary, a strong easterly set at one part may within a few miles cause an equally strong counter-current to the westward. Thus, a ship proceeding northward may have ascertained during a run of, say, 50 miles in 5 hours, that she has been set 8 miles westward, but she must not conclude from that fact that the next 50 miles will be subject to the same current, for it is not only possible, but quite probable, that she may be on the point of entering a space where the current is in the opposite direction and of equal force.

Season currents.—From about May to September, while the South-west monsoon is blowing in the Indian ocean, the water runs out of the Red sea; but, during the North-east monsoon, from October to March, it runs in; thus accounting for the difference of level before remarked upon, which has been observed to depend upon the season of the year.

In the strait of Bab-el-Mandeb these currents often have a rate of 30 or 40 miles a day, but their strength is much diminished a few miles up the sea; and in the strait it is somewhat confused through the irregular tidal influence there felt. At the change of the monsoons there is little or no current.

Surface current.—From observations made by H.M. surveying vessel *Stork*, in January 1898, whilst at anchor in 118 fathoms 7 miles S.W. by W. from Perim island, it would appear that the surface current runs steadily into the Red sea at that season at an average rate of $1\frac{1}{2}$ knots per hour; but that although the current is always setting in, on the surface, its rate is greatly accelerated, or retarded, by tidal influence. From about 8 hours before to 4 hours after the highest high water at Perim, the rate of the current inwards is from $1\frac{1}{2}$ to $2\frac{1}{2}$ knots; whilst from 4 hours after, to 8 hours before, the highest high water, the rate of the windward current is from 0 to $1\frac{1}{4}$ knots.

Under-current.—From observations made in the strait of Bab-el-Mandeb in January, 1898, it was established that while a permanent surface current of about $1\frac{1}{2}$ knots an hour was setting into the Red sea, at that season, that of the southerly winds, there was at the depth of 105 fathoms a permanent current setting outwards at probably the same rate, the dividing line between the two permanent currents being at the depth of about 75 fathoms. Both are influenced by tide as mentioned above.

GULF OF ADEN and ARABIAN SEA.—Great attention has been given to the subject of the currents of the gulf of Aden, and the general conclusion arrived at is, that they are set in motion by the prevailing winds of these regions, increasing or decreasing in rate according as the winds increase or decrease in force; also, that, near the shore, they are in some degree influenced by the moon's age and consequent tidal action, which latter influences are very irregular and uncertain in their operation.

As these prevailing winds are chiefly those of the Arabian sea, it becomes convenient to consider the currents of the gulf of Aden and Arabian sea together; and, as the currents of both depend on the monsoon which may at the time be blowing, it is again convenient to describe the currents of the two seasons separately.

South-west monsoon.—The currents in the Arabian sea at this season are regular in direction, but their rate depends much on the force of the wind and local circumstances. Their general direction in the

middle of the sea is about East, inclining to S.E. as the western coast of India is neared; the average rate is one mile an hour.

On the northern part of the eastern coast of Africa, southward of and off Ras Asir, the current, though variable, generally sets northward along the coast, but inclining off the land, at from 2 to 4 miles an hour;* the maximum rate being at times attained in July and August. It passes through the channel between Sokótra and Ras Asir at about the same rate, the main body from thence pursuing a north-easterly direction until it mingles with the current setting along the Arabian shore out of the gulf of Aden, which, as elsewhere stated, runs from one to 2 miles an hour. In the offing its direction may vary from North to E.N.E., with a rate at times of 3 miles an hour.

At Ras Asir, the in-shore branch of the current sets close round that cape to the westward and close along the African shore at about one mile an hour as far as Ras Khanzir, near the meridian of Aden, where it turns off to the northward and eventually unites, as the main body has already done, with the easterly current along the coast of Arabia.

About 150 miles southward of Sokótra is a great whirl of current, caused possibly by the interposition of the island; or, it may be that shoaler water exists at that spot; it commences about the parallel of Ras Hafun, when the current strikes off eastward to the 55th meridian, then southward to the 6th parallel, from whence it again curves north-eastward, through West, forming a complete whirl. At the northern limit, the velocity is about 4 miles an hour, while, at its southern extreme, it is only about one mile an hour. A very heavy confused sea is created by this whirl. In making the coast of Africa from the eastward, care should be taken to avoid the strongest portion of this current by keeping well to the southward.

Northward of Sokótra, during the strength of the monsoon the current sets E.N.E. about 2 miles an hour.

North-east monsoon.—During this season, the current in the Arabian sea generally sets south-westward, its rate depending on the force of the wind. When the wind is light there is little or no current.

On the eastern coast of Arabia, between Ras Madraka and Ras Al-Hadd, the current sets south-westward at about three-quarters of a mile an hour.

During the North-east monsoon, the general set of the current on the northern shore of the gulf of Aden, and on the northern coast of Sokótra, is westward, and the rate, from three-quarters of a mile to $1\frac{1}{2}$ miles an

* Though this statement fairly represents the general averages of the current at this season; the seaman should know that as little as 20 miles a day is sometimes experienced, and as much as 100 miles a day has been actually registered.

hour. On the African shore of the gulf, there appears to be a counter current of about one mile an hour, from about December.

In the centre of the gulf the currents are variable, but chiefly westerly; when the monsoon is very strong, its rate may amount to $1\frac{1}{2}$ miles an hour.

Southward of Sokótra, when this monsoon is fully established, the set is south-westward, and the rate from one to 2 miles an hour.

Luminosity of the sea.—Appearance of shallow water.—The sea, both in the Red sea and gulf of Aden, is remarkable for its occasional peculiar luminous brilliancy at night; without any warning it will become suddenly illuminated, as if on fire, causing alarm to the stranger who may be unacquainted with the phenomenon, by giving him the idea of his vessel being amongst breakers, but on casting the lead the deception becomes apparent. It occurs in the open sea as well as near the land, and whether in a calm or with a breeze. This appearance is probably caused by the presence of *confervæ* or other organic matter in the water.

By day, large patches of discoloured water due to these causes, and well known to be not uncommonly met with in the Red sea, have frequently been mistaken for and reported as shoals, the appearance of which they precisely resemble, the test of the *lead* having been unfortunately neglected.*

BAROMETER and THERMOMETER. †—Though

* In December 1886, Lieut. C. G. S. Eeles, H.M.S. *Dolphin*, remarks, "While steering for Massawa, and being just north of Madote island, the ship passed through a streak of bright red floating matter, about 10 yards broad and extending to the horizon on each beam. The following day, while moored in Massawa harbour, the surface of the water was nearly covered by dense and brilliant patches of the same substance, drifted in on the flood tide. A sample of this apparently red water (the patches extended some feet below the surface), on examination by a lens, was found to consist of masses of minute transparent globules, the size of a small pin's head, each globule having a bright red speck at one end. The enormous quantity of these bodies gave the water the extraordinary appearance of having had powdered red lead strewn thickly on its surface."

In the same region, during the *Fawn's* survey of 1876, the ripples from the ship's bow broke as blood-red wavelets, causing a most remarkable appearance; at night, the water was brilliantly illuminated.

Lieut. G. C. Frederick, H.M.S. *Sylvia*, also remarked, in May and June 1888, "Whilst surveying between Jebel Teir and Hanish islands, large patches or streaks of discoloured water, caused by spawn, were frequently met with, and generally inside the 100-fathoms line. These patches appear exactly like shoal water at a short distance, but, though soundings were taken, no changes were found in the depth, and there can be no doubt that these appearances often lead to reefs being reported by passing vessels who have not the time to verify their statements."

This phenomenon has been repeatedly remarked on and described by other observers, and it is occasionally seen in the central channel of the Red sea as well as near the shoals on either side.

† See Appendix, pages 478-484.

barometric pressure varies but slightly in the Red sea and gulf of Aden, except on those rare occasions of cyclonic disturbance already referred to, yet, a careful consideration of the statistics arranged by the British Meteorological Office and of the deductions from them is of very great value, and unmistakably demonstrates the intimate connection between barometric pressure and temperature on the one hand, and the winds and currents of these regions on the other.

Thus, in the month of January the mean height of the barometer is found to range from about 30·10 in the gulf of Suez to 29·97 in about lat. 15° N., giving a gradient of 0·13 in about 1,100 miles. A second maximum of about 30·06 then exists in the eastern part of the gulf of Aden, giving a rather smaller gradient, but for only about half the distance. The mean temperature at this time is from 64° in the gulf of Suez to 79° in lat. 16° N.; whilst in the gulf of Aden the mean temperature is about 77°. This is the season of the North-east monsoon in the Arabian sea, and, as described in previous pages, north-north-westerly breezes are blowing down the Red sea simultaneously with easterly and south-easterly breezes through the gulf of Aden, and up through the southern part of the Red sea towards that belt where barometric pressure is lowest and temperature highest.

Again, in July the mean height of the barometer ranges from 29·79 in the gulf of Suez to 29·67 off Aden; being throughout about 0·30 lower than in January, but the minimum, in lat. 15° N., has ceased to exist, and also the relatively high pressure over the gulf of Aden. The mean temperature now ranges from 82° in the gulf of Suez to 90° in the southern part of the Red sea. A sharp fall appears on nearing Perim, and a second minimum of 84° is reached off Aden. These temperatures are higher than those for January by 18° for Suez, 11° for the southern part of the Red sea, and 7° for the gulf of Aden. At this season, the belt of low pressure in the southern part of the Red sea has disappeared, and the wind is found to blow continuously from the gulf of Suez, the point of permanent highest pressure, down the Red sea for its whole extent, and then out through the strait of Bab-el-Mandeb and gulf of Aden.

The southerly winds of the winter in the southern part of the Red sea are thus seen to have an intimate connection with the low pressure of 29·97 in lat. 15° N., but whether the winds blowing towards one another at this season cause the low barometer, or the low barometer causes the winds, is still a disputed point.

The low pressure over the southern part of the Red sea is evidently connected with the permanently high temperature of that region.

Sea temperature.—The mean sea temperature for January ranges from 65° in the gulf of Suez to 79° in lat. 19° N.; and from this position southward, as well as in the gulf of Aden, the temperature is

between 77° and 79° ; these temperatures are some 1° or 2° higher than that of the air. In July, the sea temperature ranges from 77° in the gulf of Suez to 89° in the southern part of the Red sea, and then, like the air temperature, it decreases rapidly to 84° near Perim, the minimum of 81° being reached off Aden; in the eastern part of the gulf it again increases to 84° or 85° . These temperatures are respectively higher than those for January by 12° at Suez, 10° in the southern part of the Red sea, and from 3° to 5° in the gulf of Aden. The sea temperature at this time appears to be about 5° lower than that of the air in the gulf of Suez, and in the southern part of the sea about 1° lower.

Southward and eastward of Ras Asir and off Ras Hafun there are remarkable changes and differences of sea temperatures, especially during the South-west monsoon, which it was thought at one time might prove of great use to the navigator when more knowledge on the subject had been experimentally acquired. The researches of the British Meteorological Office, however, as shown by the wind, current, and sea temperature charts of this vicinity (published by them, 1891), prove beyond a doubt that the mariner should place no trust in sea temperature as a factor in the navigation of his ship in this neighbourhood.*

The general result of these investigations may be said to show that the temperature of the sea surface off Ras Asir is much higher than off Ras Hafun during most of the South-west monsoon season. In July, when the monsoon is at its strongest and sometimes blows with the force of a whole gale, this is especially marked, the sea temperature within 5 miles of Ras Asir ranging from 88° to 77° , whilst a temperature of 80° and upwards is found 15 miles southward of that headland; but off Ras Hafun it is generally below 70° , and often down to 65° . This area of cold water along the African shore is very obvious, though from the changing nature of its limits, it is impossible to define them, and its existence is therefore of no use as an indication of a vessel's position; at times the change from cold to hot water is very sudden as Ras Asir is approached.

June and August may be said to resemble more or less the conditions of July, but in September they are very uncertain, though the cold water is still generally to the southward, and the average temperature is much lower in-shore off Ras Hafun than off Ras Asir; on the other hand, it then ranges comparatively high at some distance off Ras Hafun, and low at a very short distance off Ras Asir.

In the North-east monsoon these great differences of sea temperature in this region become much less marked. Thus, in January, during the height of the monsoon, the temperature of the sea between Ras Asir and

* These charts are published for each month of the year, and embrace the area defined by the following limits, viz.: between lats. 10° N. and $12^{\circ} 20'$ N., and between longs. $50^{\circ} 30'$ E. and 53° E.

Sokótra varies from 73° to 79° or 80° , and is very similar to that off and in the neighbourhood of Ras Hafun; the current also is variable, seldom exceeding one mile an hour, and the north-easterly wind is light, though it sometimes attains the force of a strong breeze.

In May, when for a part of the month the North-east monsoon still blows, and, if the South-west monsoon has commenced it has not acquired any strength, it has been observed that the water is fairly warm over the whole of this area.

CLIMATE.*—The climate of the Red sea, during the summer, is perhaps, with the exception of that of the Persian gulf the hottest in the world on the sea. In the latter part of June, the thermometer on board ship has been known to remain at 98° for three consecutive days and night; in August, it not uncommonly rises to 105° in the shade. In vessels proceeding to the southward during this season, the great heat is often intensified by a light following wind insufficient in strength to cause a ventilating current of air to pass through a ship; and, moreover, the almost complete saturation of the air deprives a breeze of any invigorating effect. Near the shores, the air is not so damp and the heat is somewhat more bearable, even though the temperature should be higher.

Those not compelled to make voyages at all seasons, should avoid the Red sea from May to September both months inclusive. Death from heat apoplexy are not uncommon at that season.

In the winter, the climate is by no means unpleasantly hot.

In passing out of the Red sea into the gulf of Aden in the hot season, a pleasant change of temperature is at once experienced. Also, in proceeding to the northward in the Red sea, when the dry northerly wind sets in, the thermometer gradually falls, and a cool and agreeable sensation is felt.

The climate of the gulf of Aden though warm is cooler than the Red sea and may be considered generally healthy, there being no disease peculiar to it. Chills, and also exposure to the powerful sun, should be avoided. The natives of India, when on these coasts, are subject to beri-beri, a dropsical disease, which usually proves fatal in a few months; the only treatment for it appears to be a generous European diet.

The Temperature in the gulf of Aden varies with the prevailing winds; the following is the average range of the thermometer throughout the year :—

January, February, and March.—Weather generally clear. Thermometer ranges from 68° to 80° Fahrenheit.

April.—The weather becomes warmer. Thermometer 80° to 86° .

May.—Owing to light winds and calms, it is frequently intolerably hot. Thermometer 84° to 95° .

* See Appendix, pages 478–484.

June.—During a westerly wind the temperature is considerably lower, and the change on leaving the Red sea surprising.

July and August.—Thermometer ranges from 77° to 87° .

September.—The weather again becomes warm, owing to the cessation of westerly winds. Thermometer ranges from 84° to 96° .

October.—Towards the end of this month the nights become cooler, and at sunrise the thermometer sometimes stands as low as 78° .

November and December.—From the commencement of November to the end of the year, the weather gradually becomes cooler as the North-east monsoon increases, the thermometer ranging between 76° and 84° .

During the South-west monsoon, on the African coast, the heat is insufferable, especially when a land wind is blowing, at which time the thermometer sometimes rises to 110° Fahrenheit. The natives leave the coast at this season for the mountains to escape the heat and there is consequently a cessation of trade.

On the coast of Arabia, northward of Merbat, the weather is more pleasant than in the gulf of Aden, and during the months of December, January, and February, it is even cold at night.

RAINFALL.*—The rainfall throughout the regions comprised in these descriptions is comparatively small. It is greatest in the neighbourhood of Sokótra, and becomes gradually less through the gulf of Aden and southern part of the Red sea; the northern part of that sea is, as has been already stated, in a practically rainless district.

In the southern part of the Red sea, rains may occur from October to March, and even as late as May. About December, strong south-easterly winds bring squalls with rain; and, during March, April, and May, the weather is here unsettled with occasional showers of rain.

In the gulf of Aden, light rains fall from November to about February; and, eastward of Ras Rehmat, in July and August also. In Sokótra, there are heavy rains from November to February, and light rains from June to August.

NAVIGATION and PASSAGES.—The dangers in navigating the Red sea have at various times been much enlarged upon; but it may now be said that, for steam-vessels, no difficulties exist which may not, with ordinary caution and attention, be easily overcome; one of the principal dangers undoubtedly arises from the uncertain cross currents frequently experienced, *see* page 20; but, from the clearness of the atmosphere, although occasionally the horizon may be hazy, astronomical observations can almost always be made, and the ship's position thus constantly checked. On account of the excessive refraction, well known to exist in these waters, no opportunity should be lost of verifying the position by means of early twilight, dawn, and night star sights; in fact,

* See Appendix, pages 478–484.

this practice should be made a routine to be regularly observed. The gulf of Aden is so free from dangers, that its safe and expeditious navigation may be said to depend mainly on a correct knowledge of the prevailing winds, and the currents resulting from them, as previously described.

Sailing vessels at times experience great difficulties when working against the strong winds, which, in the winter season, blowing from either end of the Red sea towards its centre, produce a short hollow sea, and, combined with the strong current that often runs with the wind, renders the progress of such vessels very slow.

The adverse winds of the Red sea are also much felt by steam-vessels having but small power, as they are obliged, though under steam, to work to windward under fore and aft sails. Indeed, to steam against the N.N.W. wind of the northern part of the Red sea, or against the S.S.E. wind of the southern part, often requires a full-powered ship.

It has frequently happened that outward-bound steam-vessels running short of coal have been obliged to anchor on the northern side of Jebel Zukur, or in Kamaran bay, waiting for relief by an approaching vessel in consequence of not having economised their fuel. Vessels are recommended therefore, during the winter season, to make all possible use of sails whilst the fair northerly wind lasts, in order to have a good reserve of coal when contending against the S.S.E. wind.

Caution.—The mariner is cautioned nowhere to approach closely the outlying reefs, for, if bordering upon them in the expectation of hearing or seeing the surf, it is important he should be reminded that under no condition of wind or weather is there a heavy surf on the reefs. The strength of the current also is much greater in their immediate vicinity, besides being often of a rotary nature; an additional reason for giving these dangers a wide berth at night.

In the neighbourhood of, and amidst the cluster of reefs, a chart can avail the mariner no farther than in marking their outer boundary; within this, having the sun astern of the vessel, he must be guided by the eye, as the only and best pilot, and a little practice in this mode of procedure will enable him not only to distinguish the dangers, but also to estimate, from the various shades of colour, the changes in the depth of water.

Native Pilots.—Before the Red sea was so much frequented, it was customary for ships to engage Arab pilots for the voyage; and in the gulf of Suez especially, before it was lighted, the services of these men were of considerable value. The altered circumstances of navigation have, however, done away with the necessity for this class of pilot altogether. Strictly local native pilots are still of service occasionally; their familiarity with the positions of shoals and reefs in their own localities being very

useful knowledge to a stranger, especially under circumstances not favourable to piloting amongst reefs by the eye.

THE INNER CHANNELS.—The use of these passages for small steam-vessels, when prevented by foul winds from pursuing a direct course by the central channel, has had several able advocates.

With the exception of occasional gaps, a continuous line of reefs run nearly parallel with the shore, along the whole line of the Arabian coast; and, in the channel formed between the reefs and the shore, there is always smooth water, and nearly always the depths are not too great for anchorage; for this and other reasons the Inner channel on the eastern side is naturally easier of navigation than that on the western side. The numerous detached coral rocks and banks nearly all have deep channels between them which are often traversed by the native coasting vessels who use these channels with fresh, fair, or foul winds.

This passage was twice pursued by the East India Company's surveying brig *Palinurus* without accident; but, in the absence of important trading ports on the eastern coast, it is questionable whether it will ever be much used by steam-vessels, as it is encumbered by innumerable detached coral rocks and banks which can only be seen under favourable conditions of light, necessitating slow progress and great loss of time.* The rising importance of some of the ports on the western shore of the Red sea have, however, led to the Inner channels on that side being partially lighted, much more frequented, and better known than formerly.

If going from Jidda to Sawákin, or even to Massawa, in order to pass into the Inner channel, native craft cross southward of Makawar island, or through one of the channels between the reefs southward of it, and return in a similar manner. In fine weather, with moderate fair winds they often steer from Jidda direct to Romiya island, on the northern part of the Dahalak bank.

The boats bound to Massawa, also frequently sail down the Arabian coast to near Kotunbul; then, quitting the Inner channel at daylight, they proceed across the reefs, passing the Simer islands, and when clear of the reefs, with northerly winds, they run across to make Romiya island; but, with southerly winds, they keep their luff and cross amongst the numerous islands on the Dahalak banks to Massawa, from whence they return in the same way to Jidda.

FULL - POWERED STEAM - VESSELS TRACK THROUGH RED SEA AND GULF OF ADEN.—OUTWARD BOUND.—A steamer having cleared Suez bay, for which purpose the Kal ah Kebireh lights and Newport rock light, together with the

* H.M.S. *Philomel* in February 1881 proceeded by the Inner channel from Loheiya to Lith. Throughout the passage, which occupied seven days, the sea was uniformly smooth and no current was experienced. The winds were chiefly from N.W., blowing strongly in the afternoon and falling light at sunset.

beacons and buoys marking the various shoals, afford ample guidance, *see* page 89, should steer down the gulf of Suez, keeping the western shore on board, but carefully avoiding the shoal which extends a considerable distance off Zarafana point. That point as well as Ras Gharib, 52 miles farther south, have lights very useful as marks by night, as also are the structures by day, especially the latter; a bearing of this should enable a ship to avoid the dangerous Sheratib shoals projecting from the opposite shore, as well as the Moresby shoal of only 3 fathoms lying in mid-channel 20 miles south-eastward of Ras Gharib.

The high land of the Zeiti hills makes at first like an island, and is a good mark in approaching the strait of Jubal. By the time a ship is abreast of Ras Zeiti, the Ashrafi light should be well in sight; it should be passed from one to two miles distant, the width of the strait between the islands and shoals on the western side, and the dangerous Shab Ali on the eastern side, being here only $6\frac{1}{2}$ miles. Shab Abu Nahas, a reef which does not uncover, and lies off the northern end of Shadwán island, is the most out-lying reef on the western side of the strait; *see* detailed description at page 105. Ashrafi lighthouse shut in with the high land of Zeiti by day, or the light kept on a N.W. bearing by night, clears this shoal, shortly after passing which the light on Shadwán island will show on a S. $\frac{3}{4}$ W. bearing. In order, however, to clear the reefs on the eastern side of the strait, the eastern side of Shadwán should not be brought westward of S. $\frac{1}{2}$ W., nor the light opened out, until the peak of Jubal island bears northward of West; *see* also directions, page 113.

During the run down the gulf of Suez, the ship's position should be constantly checked in passing headlands or other conspicuous marks; for, the tidal streams, though they set fairly up and down in mid-channel, set towards the shoals as they are neared, and in the neighbourhood of some of the principal reefs their direction is extremely uncertain. Should a vessel require temporary anchorage whilst passing down or up the gulf, there are several available on each side, all of which will be found fully described in Chapter III.*

* On the eastern side are—the anchorage southward of Ras Mesalle, *see* page 91; at Ras Abu Zenima, *see* page 95; Tor harbour, in lat. $28^{\circ} 13' N.$, *see* page 99; Sheikh Biyah harbour, 5 miles south-eastward of Tor, *see* page 100; under the southern point of Shab Ali reef, *see* page 111; Mersa Tal Kad Yayah, in lat. $27^{\circ} 56' N.$, a very good anchorage, *see* page 111; Mersa Towila, 7 miles south-eastward of the last named, *see* page 112; and, under shelter of Shab Mahmoud, near Ras Muhammed, *see* page 112.

On the western shore are the following anchorages:—Southward of Zafarana point, *see* page 92; near Ras Abu Baka, 15 miles north-westward of Ras Gharib, *see* page 94; under shelter of Ras Gharib, *see* page 95; at Umm-el-Kyaman, 7 miles north-westward from Ashrafi lighthouse, *see* page 97; at the Gaysum islands, westward of Jubal island, *see* page 103; southward of Jubal island, and also of Scail Seria, *see* pages 104, 105; and on the western side of Shadwán island, *see* page 106. Besides these anchorages there are others fit for temporary use which will suggest themselves to the seaman on consulting the chart.

When abreast of Shadwán island, a vessel may shape her course down the Red sea, passing 3 or 4 miles eastward of the Brothers, two little coral islets close together, and surrounded by deep water, with a lighthouse on the northern island. These islets are 80 miles S.S.E. $\frac{1}{2}$ E. from Shadwán lighthouse, and 100 miles farther in the same direction is the Dædalus reef, a small coral patch occasionally awash, but generally covered; it is only 6 cables long by $2\frac{1}{4}$ cables wide, and steep-to; and, as it also has a lighthouse, it may be safely passed on either side, night or day, at a short distance.

From the Dædalus reef to Jebel Teir, the distance is about 656 miles, and there is a clear run down the central track for more than half that distance before the off-lying shoals of the Sawákin group and Dahalak bank on the western side, and the countless islands and reefs of the Farisan bank on the eastern side, commence to narrow the width of the navigable channel, which from thence southward becomes constantly narrower and more dangerous until the strait of Bab-el-Mandeb is passed. From the central track, St. John's island, 80 miles southward of Dædalus reef and 700 feet high, as also the Elba mountains and other high land on the western side of the sea, can generally be seen.

During the run down the Red sea it is especially necessary that the mariner should be on his guard against the effect of cross currents to which reference is so frequently made, and to which attention is specially directed on every Admiralty chart of the Red sea; see page 20. No opportunity should be missed of checking the ship's position by astronomical observations, night and day, and it should be remembered that on account of the excessive refraction well known to exist in these waters, the most accurate results are those obtained at early twilight and dawn.

Jebel Teir island may be safely steered for even on a dark night; it is only about $1\frac{1}{2}$ miles in diameter, 800 feet high, and steep-to; it is high and conical, gradually sloping to the extremes. Southward of Jebel Teir, and lying in the central track to the strait of Bab-el-Mandeb are the Zebayir, Jebel Zukur, and Hanish islands, for detailed descriptions of which, see pages 73–82. The Zebayir Group of ten islets, besides rocks and shoals, occupy a space 13 miles in length S.S.E. and N.N.W.; they are rugged and barren, the highest rising 627 feet above the sea. Both Jebel Teir and the Zebayir group should be passed on their western side, a good look-out being kept for Quoin island, the northernmost of the group, if the night be dark, as it is only a cable in length and 100 feet high, but the water is deep within $2\frac{1}{4}$ cables of it.

From Zebayir, some steamers pass westward of Jebel Zukur and Hanish islands, see note page 83; but the track hitherto best known and now described lies eastward of Jebel Zukur and of the Hanish islands.

Jebel Zukur is nearly 10 miles long North and South, by 7 miles wide, and 2,047 feet high; close off its northern end is a little islet called High island. At 3 miles eastward of North point, Jebel Zukur, lie the Abu Ail islands, of which the western island is 345 feet high; the channel lies between Jebel Zukur and the Abu Ail islands and is called the Abu Ail channel.

In passing westward of the Zebayir islands, and steaming against a southerly gale, so commonly met with during the winter season, it is advisable to give them a good berth, as the set of the swell is towards the rocks; a ship should keep about a mile clear of them.

From that distance westward of Centre-peak island, the south-western-most of the group, to mid-channel between Jebel Zukur and Abu Ail, the course and distance is S.S.E. $\frac{3}{4}$ E. 66 miles; this course, however, only leads $5\frac{1}{2}$ miles westward of the *Avocet* rock. Great care should be taken to keep westward of this rock, bearing in mind the repeated cautions given as to the lateral or cross currents so frequently experienced in this sea, and to which, beyond a doubt, the loss of the *Avocet* was due.

The navigable width of the Abu Ail channel is more than 2 miles at the narrowest part, and the mid-channel depths from 40 to 50 fathoms; see page 79. The Hanish group occupy a space extending 18 miles southward of Jebel Zukur, but, after passing East point of that island, one mile distant, a ship's course carries her still further eastward of all the islets of the Hanish group. The course from the centre of the Abu Ail channel to a position 6 miles W.S.W. from Mokha is S. by E. $\frac{5}{8}$ E. 52 miles; this leads $2\frac{1}{2}$ miles eastward of Low island, Little Hanish, and $4\frac{1}{2}$ miles from Mushéjera. As both islands are low and flat, it is best to give them a rather wider berth at night unless the weather is bright and clear.

The high minaret of Mokha, and, next, the town itself, will be seen, as that place is approached. Shoal patches extend nearly 4 miles westward of it, but a depth of not less than 15 fathoms ensures passing outside them. The soundings along this coast are pretty regular, and the lead is a good guide. From off Mokha, a course may be shaped for Perim island. Vessels hugging the shore to avoid the strength of the wind and sea must beware of the shoals lying southward of Zi hill; the Chiltern patch of 3 fathoms, or possibly less, the outer shoal, is fully $2\frac{1}{2}$ miles from the shore and has from 10 to 12 fathoms close to it. If necessary, anchorage may be found in the bay as Ras Bab-el-Mandeb is neared, and there are many anchorages available in the southern part of the Red sea after Jebel Teir is passed.*

* Some of the best anchorages are :—Under Zebayir island, see page 74; at Jebel Zukur, see page 78; at Little and Great Hanish, see page 80; also in Kamaran bay, see page 312; in Mokha road, see page 340; and in the bight between Bab-el-Mandeb and Zi hill, see page 341.

Strait of Bab - el - Mandeb.—In steering for the strait, Ras Bab-el-Mandeb makes as an island, with several peaks, sloping down to a low point on the sea; immediately off the point is Oyster islet with reefs extending 2 cables from its southern and western sides. Perim island will be seen to the right of the peaks when 15 or 20 miles distant; it is of moderate height, its outline even and unbroken, and it has lighthouses at each extreme and on its summit. A dangerous reef extends 2 cables off Azalea point, its south-eastern extreme. The Large strait is on the western side of Perim and is 9 miles wide; the Small strait, through which is the usual and most direct track, is between Perim and Ras Bab-el-Mandeb; the navigable channel for large ships is nearly $1\frac{1}{4}$ miles wide at its narrowest part, and, being well lighted, is, with care, easy of navigation by day or night. Vessels should keep rather nearer to the Perim shore than the centre of the channel, Oyster island being difficult to make out at night owing to the high land behind it; *see* page 230 for detailed description of the strait of Bab-el-Mandeb.

In the passage of this strait it must be remembered that the current becomes very strong at certain seasons, the water running out of the Red sea from June to September, the South-west monsoon season, and into it from November to April, the North-east monsoon season. During the strength of the monsoons it may be expected to run at the rate of 40 miles per diem.

Gulf of Aden.—Having passed through the strait of Bab-el-Mandeb, and, after carefully avoiding the shoal ground extending off shore between Ras al Ará and Ras Kaáu, having touched at or passed Aden, the navigation, from the absence of central islands, shoals, or obstruction of any kind, becomes of a different character to that of the Red sea, and the season of the year with its prevailing monsoon becomes the important consideration. Of mail and all other full-powered steamers, it need only be said that during both seasons they take the direct route to the Persian gulf, Bombay, Colombo, and other Indian ports; and, nearly so, to the Seychelles and Zanzibar.

SMALL - POWERED STEAM - VESSELS. — OUT-WARD BOUND.—The track of this class of steamer during the summer or South-west monsoon season is precisely the same through the Red sea, gulf of Aden, and beyond, as that of full-powered vessels, if bound for the Persian gulf or for any of the Indian ports; but, for other parts, they have to accommodate themselves to the prevailing wind as soon as the limit of the South-west monsoon is reached, thus:—

If bound for Seychelles or Zanzibar, and having passed northward of Sokótra, they should stand away to the south-eastward on the starboard tack and cross the equator in about 70° E., or as far westward as the

monsoon permits; from thence, steaming to the southward through the doldrums, to fall in with the South-east trade, which will be met with in from lat. 2° to 4° S., and from thence direct to Seychelles or Zanzibar, making due allowance for the strong northerly set likely to be experienced when approaching the latter island.

In the winter season, when the North-east monsoon of the Arabian sea causes strong south-easterly winds to prevail in the southern part of the Red sea, steam-vessels of small power proceeding to the southward may with advantage pass through the Massawa channel, westward of the Dahalak bank and islands. With this object, they should steer for North Bluff hill on the western shore, when southward of the Sawákin group, and keeping from 2 to 4 miles off shore, steer to the southward, passing inside the foul rocky ground, 7 to 10 miles north-westward of Gannet bank, and westward of the latter shoal, as also of Difnein, on which island there is a light. See also directions, page 180. At 36 miles southward of Difnein is another light on Sheikh ul Abu island, and again at 45 miles farther south-eastward is a light on Shumma island, which latter island lies in the centre of the channel; the passage, called the Narrows, lies between Shumma and the Assarka islands. Until Shumma island is neared, the navigable width of the Massawa channel is from 5 to 8 miles, but in the Narrows it is barely $2\frac{1}{2}$ miles. The depths are moderate, from 40 to 25 fathoms, but deepening to 50 and 60 fathoms as the Narrows are neared and shoaling again in them and after they are passed. In the channel, land and sea breezes are experienced, and, outside their limits, the south-easterly winds blow with less strength than in the central track. See page 178 for detailed description of the Massawa channel.

After passing Shumma, and here the south-easterly swell begins to make itself felt, the channel again opens out, but a vessel should keep as close to the western shore as safety permits, the chart being the best guide, and every advantage should be taken of the lee afforded by headlands, islands, &c., until near the entrance of Asab bay, when it is best to quit the western shore, and passing northward of the Fieramosca shoal, with fore and aft sails set, to cross to the eastern side near Zi hill or as far South as the ship will fetch. From thence, the passage through the strait of Bab-el-Mandeb and as far as Aden is the same as already described for full-powered ships.

In the North-east monsoon, steam-vessels of small power, after passing Aden, should keep close along the Arabian coast. The wind generally blows from about E.N.E., or in the direction of the coast, but its force seldom amounts to 5. If bound to the Persian gulf, they should, if possible, keep to the coast as far as Ras Al-Hadd, using steam and sail and taking every advantage of a shift of wind; and from Ras Al-Hadd stand over to the northern shore of the gulf of Omán. If the monsoon is too

fresh to be faced, proceed as for Bombay, until in about lat. 14° N., long. 69° E., then steam due North to about lat. 19° N.; and from thence on the starboard tack to the Persian gulf.

If bound to Bombay, the coast should be kept aboard as far as the Khorya Morya islands, or beyond them if the monsoon is light there; but, if the monsoon is fresh, the vessel may make sail before reaching the islands and stand to the south-eastward, as the wind will gradually draw to the northward, or westward of North, as the vessel advances eastward, enabling her with steam and sail to head for Bombay.

If bound to Ceylon and the monsoon is fresh, sail may be made from abreast of Ras Fartak, in long. 52° E., though it is desirable to get a little farther north-eastward if possible.

FULL - POWERED STEAMERS.— HOMEWARD BOUND.—Mail and other full-powered steamers from Colombo and the southern ports of India, take the direct route during the South-west monsoon as before stated, passing either northward or southward of Minikoi island light; from thence, northward of Sokótra for Aden and the Red sea.

From Bombay, the direct route is taken by the Peninsula and Oriental Company's steamers and similar vessels, unless the monsoon is unusually strong; at which times they, as well as most moderate-powered vessels, take what is now known as the northern passage. Those of small power take the southern route, hereafter described.

CAUTION.—It is always dangerous to pass near, or attempt to weather, Sokótra in the south-west monsoon; as often the land is shrouded in mist, and the depths are so considerable that the lead gives no warning of proximity to the dangers which extend some distance from the shore. Moreover there is little to be gained, in point of time, by passing close to this island as vessels passing 40 miles north of it only add 8 miles to the distance from Colombo to Aden; no ship should therefore attempt to make the island or pass it within 40 miles, when bound to the westward, more especially in the south-west monsoon.

The Northern passage is about 50 miles longer than the direct route, and is made by keeping on the parallel of Bombay until within about 100 miles of the Arabian coast, from whence the course is shaped along-shore to pass about 20 or 30 miles off the headlands. Between the meridians of 66° and 60° E. the sea and wind appear to be at their height, the sea being very high; westward of 60° , the sea, and then the wind, begin to abate.

The adverse current experienced on this passage averages one knot an hour; eastward of the meridian of 60° , it is from half to three-quarters of a knot, and, westward of 60° , from one to $1\frac{1}{2}$ knots.

In the North-east monsoon, full-powered steamers take the most direct route, whether from the Persian gulf, India, Seychelles, or Zanzibar; if from the latter places and passing between Sokótra and the mainland, *see* Caution, page 37, as to rounding Ras Asir.

Bab-el-Mandeb to Suez.—Having arrived at the strait of Bab-el-Mandeb, detailed directions for which will be found at page 231, the return track up the Red sea is the same as the outward track already described, and it is only necessary to repeat the caution so often given, that the mariner should be very watchful as to the effect of cross currents. When clear of the islands and shoals of the southern part of the Red sea, this caution again becomes especially necessary as the entrance to the gulf of Suez is neared.

Having passed the Brothers, it is best to steer direct for Shadwán island, which can generally be seen about 30 miles off by day; and, by night, its light is visible 20 miles. During this run a cross current to the westward has often been found to be very strong, but occasionally it is to the eastward. The Jifatin islands, 15 miles southward of Shadwán, with their steep brown faces, serve to identify the land-fall.

Caution.—In misty weather, by day, if a vessel has been set to the westward, the Jifatin group, sighted on a north-westerly bearing, may easily be mistaken for Shadwán island. As there is deep water on the eastern side of both groups, a vessel in any doubt should pass near enough to see the lighthouse at the south-eastern end of Shadwán, or the light, if it be at night, and thus identify the land sighted. The absence of a lighthouse would, of course, show that it was the Jifatin islands close aboard, and that the ship was standing into danger, when the course would be altered and the error in the reckoning corrected.

Having passed Shadwán at about $1\frac{1}{2}$ miles and Shab Abu Nahas at 3 miles, Ashrafi light will come in sight. By keeping this light bearing between N.W. and W.N.W. all dangers in the southern part of the strait of Jubal on both sides will be avoided.

The rounded peak of Jubal island forms a good mark to check the vessel's progress, and the western side of the strait should be kept on board, as the landmarks on that side are generally conspicuous. In thick weather do not shoal to less than 40 fathoms; *see* strait of Jubal, page 101.

After passing Ashrafi light, it should be brought to bear S.E. by S., when a N.W. by N. course leads up the gulf, passing 2 miles clear of Ras Zeiti and $3\frac{1}{2}$ miles westward of Moresby shoal. On this course, if correctly steered and no cross current experienced, a vessel should pass Ras Gharib light about 3 miles distant. From thence, a N. by W. $\frac{7}{8}$ W. course leads $4\frac{1}{2}$ miles outside Zafarana light, but care must be taken to avoid the Sheratib shoals on the starboard hand. Zafarana lighthouse when seen from the southward shows against the face of the high land

behind it. From abreast of Zafarana point, a N. by W. $\frac{1}{2}$ W. course leads 2 miles outside the shoal off Ras Abu-deraj, and when the northern end of the Abu-deraj mountains bears W. $\frac{1}{2}$ N., or when 30 miles distant from Zafarana lighthouse, steer N. $\frac{1}{2}$ E. to sight the Newport rock light-house and proceed to the anchorage in Suez bay as directed in Chapter III., page 90.

Caution.—The eastern shore between Ras Mallap and Suez should be approached with caution at night, as the coast is of a gravel colour, low, and bordered by extensive plains rising gradually to the hills, which make the distance from the shore very deceitful. As before remarked, this side of the gulf should, as far as possible, be avoided in favour of the safer western side.

SMALL - POWERED STEAMERS.—HOMEWARD BOUND.—South-west monsoon.—From Bombay the best track for small-powered steam-vessels to the Red sea during June, July, and August, is to pass westward of the Laccadive islands under fore and aft sails,* and when in about lat. 9° N., where the wind becomes lighter and the water smoother, to make westing to about long. 61° E. in lat. 7° N. Thence a vessel should edge off to the north-west for Ras Asir, taking care not to go to the northward of lat. 10° N., until in long 53° E., so as to avoid the heavy cross sea caused by the whirling current southward of Sokótra, described at page 22.

Steam-vessels with insufficient power to take the above route, should follow that recommended for sailing vessels, *see* page 40; using steam between the South-west monsoon and the South-east trade, and also along the north coast of Africa from Ras Asir to Burnt island.

An alternative route is to pass east of the Laccadive islands, through the Nine degree channel, and down to the parallel of about lat 4° N. Thence on about that parallel to about long. 60° E., and thence to the north-westward for Ras Hafun and Ras Asir.

Rounding Ras Asir.—CAUTION.—As many large and valuable vessels have been wrecked on the coast to the southward of Ras Asir (cape Guardafui), the utmost caution is necessary when rounding this headland from the southward or south-eastward during the South-west monsoon, when the weather is stormy, accompanied by a heavy sea and strong current, and the land is generally obscured by a thick haze.

The similarity of outline in the headlands of Ras Jard Hafun and Ras Asir is a fertile source of disaster. Ras Jard Hafun is, however, 2,900 feet

* *See* chart of the Arabian sea, No. 9, showing winds and currents in South-west monsoon. Almost all the rain squalls on the Malabar coast, and for 200 miles from the land, come from northward of West; and are of great assistance to steamers in making their southing under fore and aft sails.—Lieutenant Taylor's Memoir.

in height and much the higher of the two; Ras Asir being only about 780 feet and separated from Ras Jard Hafun by a broad sandy plain of little height compared with the two headlands that bound it. In hazy weather, at night, the steep fall of Jard Hafun may be dimly seen from the deck of a vessel, and when this bears southward of West, if Ras Asir is not sighted, as is often the case from the haze being thicker in the lower strata, and also from the light colour of the hill rendering it difficult to discern, the navigator, mistaking Ras Jard Hafun for Ras Asir, fancies he is rounding the latter, steers westward into the low bay of Wadi Tuhom, and discovers his error only when too late to be remedied. See page 394.

During daytime a gradual change will probably be seen in the colour of the water from blue to dark green; and the water becomes smoother and the swell alters its direction to the eastward of south, when the meridian of Ras Hafun is passed.

To ensure safety, when the land cannot be clearly seen and recognized, especially at night, the lead and the lead alone should be relied on.

As soundings extend from 10 to 12 miles from the shore, the deep sea lead should be frequently used in dark or hazy weather, and the vessel's course altered to N. by E. or N. by E. $\frac{1}{2}$ E., or if necessary still more eastward, immediately soundings are struck or the land sighted. By steering to the northward in this manner, and by not standing into less than 35 fathoms water, the vessel's safety is ensured, and as the water rapidly deepens northward of the parallel of Ras Asir, the 100-fathoms contour-line being only $2\frac{1}{2}$ miles from it, there should be no difficulty in deciding when to alter course to the westward.

When westward of Ras Asir, the African shore should be kept aboard as far as Burnt island in order to take advantage of the smooth water and favourable current; from thence, steer direct for Aden and along the Arabian shore for the strait of Bab-el-Mandeb.

From the Persian gulf to the Red sea or gulf of Aden, during the South-west monsoon, small-powered steam-vessels should stand away to the south-eastward, passing well westward of the Laccadive group, and from thence proceed as described from Bombay.

From the Seychelles and Zanzibar to Aden and the Red sea, during the South-west monsoon, small-powered steam-vessels take the direct route.

In the North-east monsoon, small-powered steamers also take the direct route from India or the Persian gulf to the gulf of Aden and the Red sea; but, if from Zanzibar, a vessel of this class should proceed through Pemba channel to take advantage of the favourable northerly current, as far as about lat. 3° S., or near Lamu, from whence she may gradually steer towards the equator and on to the Seychelles on the port tack. From the Seychelles, the westerly monsoon will take her, with a

leading wind, to the equator, which should be crossed in about long. 61° E.; from thence, steaming to the northward, the wind will gradually haul through North to N.E., enabling the vessel, with steam and sail, to fetch Ras Asir from about lat. 6° N.

Having passed through the strait of Bab-el-Mandeb, the track for small-powered steamers up the Red sea is the same as that for those of full power, though if desired, and if northerly winds should be strong, which is rarely the case in the southern part of the Red sea, the Massawa channel may be taken. It is especially worthy of notice, that in entering the gulf of Suez against the strong north-westerly winds often prevailing there, vessels of this class may gain considerably by using one of the channels westward of Shadwān; these channels, however, can only be taken by daylight, but there are plenty of good anchorages in them if overtaken by night; they are fully described at pages 108–111.

SAILING VESSELS.—Red Sea.—Though the Red sea or gulf of Aden are rarely visited by sailing vessels, occasions may occur when the following directions may prove useful:—

For sailing vessels, the most favourable part of the year for the outward voyage to India through the Red sea is from June to September, or the period of the South-west monsoon in the Arabian sea, as northerly winds of variable strength then prevail throughout the whole length of the Red sea. For the return voyage by the same route, December, January, and February are the best months, as the S.S.E. winds often carry a vessel as far as the parallel of Jidda, and sometimes as far as that of Koseir, or even, at times, to Suez itself; *see* note, page 7. After losing the S.S.E. wind, a vessel will have the N.N.W. wind to beat against; *see* remarks by Capt. Moresby on the sailing passage between Jidda and the gulf of Suez, at page 278, and also directions for beating through Jubal strait, at page 113.

In working to windward in the central channel, a vessel cannot do wrong by keeping the Arabian shore on board, but should not stand close in with a light wind or heavy swell. After dark she ought only to stand towards the shore half the distance she stands out, and should never come nearer than 10 miles to the reefs at night, to guard against the possibility of mischance from the unexpected existence of a cross current; *see* page 20. And even, if over on the western shore so far northward as Koseir, and bound for Suez with a strong northerly wind, a vessel ought to stand over to the Arabian coast, where she will probably fetch Mowila, in lat. $27^{\circ} 40'$ N. Having worked up 30 miles northward of that place, she may stand over to Ras Muhammed, leaving the Arabian coast at night. As she proceeds, the northerly winds will veer to N.N.E. out of the gulf of Akaba; by keeping as close a luff as possible, these will enable her to fetch Ras Muhammed.

At Bab-el-Mandeb, a sailing vessel should, if possible, always pass through the Small strait, as, in case of need, there is anchorage in any part of it; *see* page 231.

Gulf of Aden, Arabian sea, &c.—OUTWARD BOUND.
—S.W. Monsoon.—Sailing vessels bound to Bombay during the South-west monsoon, on leaving the strait of Bab-el-Mandeb, should either keep in the centre, or towards the Arabian shore of the gulf of Aden, in order to avoid the westerly current on the African shore; and, on reaching the South-west monsoon outside the gulf, should steer a direct course for Bombay.

Vessels bound to Ceylon or the bay of Bengal during this monsoon should shape a course to pass through the Eight Degrees or Nine Degrees channel, or on either side of Minikoi island light.

Vessels bound to the Persian gulf will find the South-west monsoon strong along the whole extent of coast to Ras Al-Hadd, except very near the shore, north-eastward of Khorya Morya bay, where the wind is liable to fall light at night.

Those bound to Seychelles, having passed northward of Sokotra, should stand away on the starboard tack, crossing the line if possible in about long. 72° E.; from thence working into the South-east trade, which should be met with in from lat. 2° to 4° S., when they may be put on the port tack for Seychelles.

North-east monsoon.—From the month of September to the month of March, the passage from the Red sea to India or the Persian gulf is very tedious for sailing vessels, and is now seldom attempted. In former times, the passage between Aden and Bombay, when unavoidably taken at this season, frequently occupied from 60 to 90 days.

Vessels leaving the Red sea for India or the Persian gulf during these months should work along the Arabian coast, taking advantage of every shift of wind. Should the current be strong in shore, it is better to stand out 60 or 80 miles from the land; but should the wind be light, advantage should be taken of the tides and land winds in-shore, anchoring when requisite. The current, which generally sets westward, will sometimes set to windward for three or four days together about the full and change of the moon. When off the Khorya Morya islands, or farther north-eastward if she can get there without much difficulty, a vessel may stand to the south-eastward, as the wind will draw to North or westward of North, as the vessel makes casting, enabling her to lay her course for Bombay.

HOMEWARD BOUND.—From Bombay.—South-west monsoon.—It is usual after the setting in of the South-west monsoon for sailing vessels bound from Bombay to Aden and the Red sea to make what is called the southern passage, or to run down south of the

equator into the South-east trade to make their westing. After working out of Bombay harbour into 15 or 20 fathoms water, a vessel may steer down the coast, keeping in soundings of from 40 to 50 fathoms; this is advisable to keep clear of the Laccadive group, in the thick, overcast, rainy weather that may be expected, when observations may not be obtainable for days together. After passing these islands, as little easting as possible should be made, as the South-east trade is fallen in with sooner to the westward than to the eastward. The wind will be from S.W. to W.S.W. with hard westerly and west-north-westerly squalls accompanied by heavy rain. A S.S.E. current of from 20 to 30 miles a day will be experienced.

As the equator is approached, the weather becomes finer and the wind more moderate; and, on the equator, light airs and calms, with cloudy weather, and possibly rain, may be experienced. This weather will continue until the South-east trade is fallen in with, which is generally in from 5° to 6° S. latitude, but it varies; it is sometimes met in 1° S., at others not northward of 8° S. or even 9° S. latitude. A vessel may run down her westing as soon as she is fairly in the trade wind, but vessels are generally obliged to pass southward of the Chagos archipelago.

On getting the South-east trade, a course should be shaped to pass about 100 miles north-eastward of the Seychelles islands, which may be sighted, for a fresh departure. The equator should be re-crossed on the meridian of 53° or 54° E. The trade wind will be steady and strong with fine weather, and carried as far as the equator, gradually veering to South and S.W., continuing moderate until in about lat. 4° N., when the South-west monsoon will increase, and reach its greatest force in about 10° N.

After crossing the equator, a course should be shaped to make the African coast between Ras Hafun and Ras Asir, due allowance being made for the strong north-easterly current which will be experienced on nearing the coast, *see* pages 22 and 37. After rounding Ras Asir, vessels should keep the African shore aboard until Burnt island is reached, when they should steer for Aden. Beating along the African shore against strong westerly and west-south-westerly winds is sometimes tedious, but a vessel should persevere, as she is more likely to get to the westward thus than in the middle of the gulf, or on the Arabian shore.

Vessels should have good sails bent, for the wind frequently blows in severe gusts along the African coast.

A good sailer may work up from Aden to the strait of Bab-el-Mandeb during the South-west monsoon if every advantage is taken, particularly at springs, when the current is liable to change and set westward; the wind, at such times, is also subject to small changes; or, in these months, a quick passage may sometimes be made by keeping near the African

shore until about 60 or 70 miles westward of Burnt island and then crossing over for the straits, or as near to them as the wind will admit; for the passage of the strait, *see* page 231.

From the southern ports of India, sailing vessels bound to the Red sea should stand southward into the South-east trade, and then proceed as from Bombay.

From the Persian gulf, the route is westward of the Laccadive group into the South-east trade, then proceed as from Bombay.

From Zanzibar and Seychelles, sailing vessels may steer direct for Ras Asir, and then proceed as from Bombay.

North-east monsoon.—From November to the end of February, a sailing vessel from Bombay, or any other port on the western coast of India, should steer a direct course to pass between the Arabian coast and the island of Sokótra, and afterwards to fall in with the land about Aden, paying attention to the lead. In these months the North-east monsoon blows fresh, especially westward of Sokótra, and a quick passage may be anticipated.

In March and April, the winds are less constant in the Arabian sea than in the four preceding months, and there are calms at times. In these months, a vessel should steer to pass southward of Sokótra; for, early in April, the North-east monsoon is nearly expended about this island and on the coast of Arabia, and is succeeded by light breezes from S.W. and West, with frequent calms. The current also begins to set strongly to the northward about Sokótra, and between it and the coast of Africa. About and from the latter end of March, therefore, it is advisable to pass about 50 miles southward of that island, in order to fetch Ras Asir with the south-westerly winds which may then be expected.

Leaving Bombay late in April, a vessel should shape a course to pass well southward of Sokotra, in order to make the coast of Africa southward of Ras Asir with the south-westerly wind, which she will probably meet with long before that shore is approached. The land may then be made anywhere between Ras Hafun and Ras Asir, and the remainder of the passage be made as directed for the South-west monsoon.

Sailing vessels bound to the Red sea from Cochin, Calicut, or other ports on the southern part of the Malabar coast, in November, December, January, or February, may steer directly to the westward through the most convenient channel among the Laccadive islands. Those from Cochin should pass southward of Suheli-par, keeping in about lat. $9^{\circ} 30' N.$; but those from Mangalore or Kannanur should pass northward of all the islands. In March and April, the prevailing winds between the Arabian and African coasts being from North to N.W., it is better to keep along the Malabar coast until northward of mount Dilli, and pass northward

of the islands; or, if the Nine Degrees channel is adopted, vessels should pass near Kalpeni and Suheli islands, as the current sets southward towards the Maldive islands in these months.

When clear of the islands, in November, December, January, or February, a course may be shaped to pass on the northern side of Sokotra; but late in March or early in April, it is prudent to keep more to the southward, in lat. 9° or 10° N. as the wind may admit; and, in May, when the South-west monsoon may be expected, it is advisable to keep well to the southward.

From Zanzibar (November to March), a sailing vessel should work to the eastward into the North-west monsoon, keeping as far to the northward as the wind will permit until that monsoon is reached; then run east, edging to the north at the latter part, as far as about long. 68° E., when stand to the northward into the North-east monsoon and thence direct for the gulf of Aden. The same route may be taken from the Seychelles.

Sokotra should be weathered if possible. If efforts are only made to pass south of it there is a great chance of being swept to leeward of Ras Asir, if the monsoon happens to be fresh. If leaving Zanzibar in March a vessel should not go eastward of the Seychelles before standing to the northward, as southerly winds might be expected before reaching Ras Asir.

CIVIL TIME.—In Egypt the official time kept is that of mean noon at the Great Pyramid, or 2h. 4m. 30·5s. fast on Greenwich mean time. The time used by railways and telegraphs, as also at Cairo, and on the Nile, is local mean time of the Abbasizeh observatory, or 2h. 5m. 8·9s. fast on Greenwich.

In the North-east monsoon, full-powered steamers take the most direct route, whether from the Persian gulf, India, Seychelles, or Zanzibar; if from the latter places and passing between Sokótra and the mainland, see Caution, page 37, as to rounding Ras Asir.

Bab-el-Mandeb to Suez.—Having arrived at the strait of Bab-el-Mandeb, detailed directions for which will be found at page 231, the return track up the Red sea is the same as the outward track already described, and it is only necessary to repeat the caution so often given, that the mariner should be very watchful as to the effect of cross currents. When clear of the islands and shoals of the southern part of the Red sea, this caution again becomes especially necessary as the entrance to the gulf of Suez is neared.

Having passed the Brothers, it is best to steer direct for Shadwán island, which can generally be seen about 30 miles off by day; and, by night, its light is visible 20 miles. During this run a cross current to the westward has often been found to be very strong, but occasionally it is to the eastward. The Jifatin islands, 15 miles southward of Shadwán, with their steep brown faces, serve to identify the land-fall.

Caution.—In misty weather, by day, if a vessel has been set to the westward, the Jifatin group, sighted on a north-westerly bearing, may easily be mistaken for Shadwán island. As there is deep water on the eastern side of both groups, a vessel in any doubt should pass near enough to see the lighthouse at the south-eastern end of Shadwán, or the light, if it be at night, and thus identify the land sighted. The absence of a lighthouse would, of course, show that it was the Jifatin islands close aboard, and that the ship was standing into danger, when the course would be altered and the error in the reckoning corrected.

Having passed Shadwán at about $1\frac{1}{2}$ miles and Shab Abu Nahas at 3 miles, Ashrafi light will come in sight. By keeping this light bearing between N.W. and W.N.W. all dangers in the southern part of the strait of Jubal on both sides will be avoided.

The rounded peak of Jubal island forms a good mark to check the vessel's progress, and the western side of the strait should be kept on board, as the landmarks on that side are generally conspicuous. In thick weather do not shoal to less than 40 fathoms; see strait of Jubal, page 101.

After passing Ashrafi light, it should be brought to bear S.E. by S., when a N.W. by N. course leads up the gulf, passing 2 miles clear of Ras Zeiti and $3\frac{1}{2}$ miles westward of Moresby shoal. On this course, if correctly steered and no cross current experienced, a vessel should pass Ras Gharib light about 3 miles distant. From thence, a N. by W. $\frac{7}{8}$ W. course leads $4\frac{1}{2}$ miles outside Zafarana light, but care must be taken to avoid the Sheratib shoals on the starboard hand. Zafarana lighthouse when seen from the southward shows against the face of the high land

behind it. From abreast of Zafarana point, a N. by W. $\frac{1}{2}$ W. course leads 2 miles outside the shoal off Ras Abu-deraj, and when the northern end of the Abu-deraj mountains bears W. $\frac{1}{2}$ N., or when 30 miles distant from Zafarana lighthouse, steer N. $\frac{1}{2}$ E. to sight the Newport rock light-house and proceed to the anchorage in Suez bay as directed in Chapter III., page 90.

Caution.—The eastern shore between Ras Mallap and Suez should be approached with caution at night, as the coast is of a gravel colour, low, and bordered by extensive plains rising gradually to the hills, which make the distance from the shore very deceitful. As before remarked, this side of the gulf should, as far as possible, be avoided in favour of the safer western side.

SMALL - POWERED STEAMERS.—HOMEWARD BOUND.—**South-west monsoon.**—From Bombay the best track for small-powered steam-vessels to the Red sea during June, July, and August, is to pass westward of the Laccadive islands under fore and aft sails,* and when in about lat. 9° N., where the wind becomes lighter and the water smoother, to make westing to about long. 61° E. in lat. 7° N. Thence a vessel should edge off to the north-west for Ras Asir, taking care not to go to the northward of lat. 10° N., until in long 53° E., so as to avoid the heavy cross sea caused by the whirling current southward of Sokótra, described at page 22.

Steam-vessels with insufficient power to take the above route, should follow that recommended for sailing vessels, *see* page 40; using steam between the South-west monsoon and the South-east trade, and also along the north coast of Africa from Ras Asir to Burnt island.

An alternative route is to pass east of the Laccadive islands, through the Nine degree channel, and down to the parallel of about lat 4° N. Thence on about that parallel to about long. 60° E., and thence to the north-westward for Ras Hafun and Ras Asir.

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From the Persian gulf to the Red sea or gulf of Aden, during the South-west monsoon, small-powered steam-vessels should stand away to the south-eastward, passing well westward of the Laccadive group, and from thence proceed as described from Bombay.

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leading wind, to the equator, which should be crossed in about long. 61° E.; from thence, steaming to the northward, the wind will gradually haul through North to N.E., enabling the vessel, with steam and sail, to fetch Ras Asir from about lat. 6° N.

Having passed through the strait of Bab-el-Mandeb, the track for small-powered steamers up the Red sea is the same as that for those of full power, though if desired, and if northerly winds should be strong, which is rarely the case in the southern part of the Red sea, the Massawa channel may be taken. It is especially worthy of notice, that in entering the gulf of Suez against the strong north-westerly winds often prevailing there, vessels of this class may gain considerably by using one of the channels westward of Shadwán; these channels, however, can only be taken by daylight, but there are plenty of good anchorages in them if overtaken by night; they are fully described at pages 108–111.

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In working to windward in the central channel, a vessel cannot do wrong by keeping the Arabian shore on board, but should not stand close in with a light wind or heavy swell. After dark she ought only to stand towards the shore half the distance she stands out, and should never come nearer than 10 miles to the reefs at night, to guard against the possibility of mischance from the unexpected existence of a cross current; *see* page 20. And even, if over on the western shore so far northward as Koseir, and bound for Suez with a strong northerly wind, a vessel ought to stand over to the Arabian coast, where she will probably fetch Mowila, in lat. $27^{\circ} 40'$ N. Having worked up 30 miles northward of that place, she may stand over to Ras Muhammed, leaving the Arabian coast at night. As she proceeds, the northerly winds will veer to N.N.E. out of the gulf of Akaba; by keeping as close a luff as possible, these will enable her to fetch Ras Muhammed.

beacons and buoys marking the various shoals, afford ample guidance, *see* page 89, should steer down the gulf of Suez, keeping the western shore on board, but carefully avoiding the shoal which extends a considerable distance off Zarafana point. That point as well as Ras Gharib, 52 miles farther south, have lights very useful as marks by night, as also are the structures by day, especially the latter; a bearing of this should enable a ship to avoid the dangerous Sheratib shoals projecting from the opposite shore, as well as the Moresby shoal of only 3 fathoms lying in mid-channel 20 miles south-eastward of Ras Gharib.

The high land of the Zeiti hills makes at first like an island, and is a good mark in approaching the strait of Jubal. By the time a ship is abreast of Ras Zeiti, the Ashrafi light should be well in sight; it should be passed from one to two miles distant, the width of the strait between the islands and shoals on the western side, and the dangerous Shab Ali on the eastern side, being here only $6\frac{1}{2}$ miles. Shab Abu Nahas, a reef which does not uncover, and lies off the northern end of Shadwán island, is the most out-lying reef on the western side of the strait; *see* detailed description at page 105. Ashrafi lighthouse shut in with the high land of Zeiti by day, or the light kept on a N.W. bearing by night, clears this shoal, shortly after passing which the light on Shadwán island will show on a S. $\frac{1}{4}$ W. bearing. In order, however, to clear the reefs on the eastern side of the strait, the eastern side of Shadwán should not be brought westward of S. $\frac{1}{4}$ W., nor the light opened out, until the peak of Jubal island bears northward of West; *see* also directions, page 113.

During the run down the gulf of Suez, the ship's position should be constantly checked in passing headlands or other conspicuous marks; for, the tidal streams, though they set fairly up and down in mid-channel, set towards the shoals as they are neared, and in the neighbourhood of some of the principal reefs their direction is extremely uncertain. Should a vessel require temporary anchorage whilst passing down or up the gulf, there are several available on each side, all of which will be found fully described in Chapter III.*

* On the eastern side are—the anchorage southward of Ras Mesalle, *see* page 91; at Ras Abu Zenima, *see* page 95; Tor harbour, in lat. $28^{\circ} 13' N.$, *see* page 99; Sheikh Biyah harbour, 5 miles south-eastward of Tor, *see* page 100; under the southern point of Shab Ali reef, *see* page 111; Mersa Tal Kad Yayah, in lat. $27^{\circ} 56' N.$, a very good anchorage, *see* page 111; Mersa Towila, 7 miles south-eastward of the last named, *see* page 112; and, under shelter of Shab Mahmoud, near Ras Muhammed, *see* page 112.

On the western shore are the following anchorages:—Southward of Zafarana point, *see* page 92; near Ras Abu Baka, 15 miles north-westward of Ras Gharib, *see* page 94; under shelter of Ras Gharib, *see* page 95; at Umm-el-Kyaman, 7 miles north-westward from Ashrafi lighthouse, *see* page 97; at the Gaysun islands, westward of Jubal island, *see* page 103; southward of Jubal island, and also of Saoul Seria, *see* pages 104, 105; and on the western side of Shadwán island, *see* page 106. Besides these anchorages there are others fit for temporary use which will suggest themselves to the seaman on consulting the chart.

When abreast of Shadwán island, a vessel may shape her course down the Red sea, passing 3 or 4 miles eastward of the Brothers, two little coral islets close together, and surrounded by deep water, with a lighthouse on the northern island. These islets are 80 miles S.S.E. $\frac{1}{2}$ E. from Shadwán lighthouse, and 100 miles farther in the same direction is the Dædalus reef, a small coral patch occasionally awash, but generally covered; it is only 6 cables long by $2\frac{1}{4}$ cables wide, and steep-to; and, as it also has a lighthouse, it may be safely passed on either side, night or day, at a short distance.

From the Dædalus reef to Jebel Teir, the distance is about 656 miles, and there is a clear run down the central track for more than half that distance before the off-lying shoals of the Sawákin group and Dahalak bank on the western side, and the countless islands and reefs of the Farisan bank on the eastern side, commence to narrow the width of the navigable channel, which from thence southward becomes constantly narrower and more dangerous until the strait of Bab-el-Mandeb is passed. From the central track, St. John's island, 80 miles southward of Dædalus reef and 700 feet high, as also the Elba mountains and other high land on the western side of the sea, can generally be seen.

During the run down the Red sea it is especially necessary that the mariner should be on his guard against the effect of cross currents to which reference is so frequently made, and to which attention is specially directed on every Admiralty chart of the Red sea; see page 20. No opportunity should be missed of checking the ship's position by astronomical observations, night and day, and it should be remembered that on account of the excessive refraction well known to exist in these waters, the most accurate results are those obtained at early twilight and dawn.

Jebel Teir island may be safely steered for even on a dark night; it is only about $1\frac{1}{2}$ miles in diameter, 800 feet high, and steep-to; it is high and conical, gradually sloping to the extremes. Southward of Jebel Teir, and lying in the central track to the strait of Bab-el-Mandeb are the Zebayir, Jebel Zukur, and Hanish islands, for detailed descriptions of which, see pages 73–82. The Zebayir Group of ten islets, besides rocks and shoals, occupy a space 13 miles in length S.S.E. and N.N.W.; they are rugged and barren, the highest rising 627 feet above the sea. Both Jebel Teir and the Zebayir group should be passed on their western side, a good look-out being kept for Quoin island, the northernmost of the group, if the night be dark, as it is only a cable in length and 100 feet high, but the water is deep within $2\frac{1}{2}$ cables of it.

From Zebayir, some steamers pass westward of Jebel Zukur and Hanish islands, see note page 83; but the track hitherto best known and now described lies eastward of Jebel Zukur and of the Hanish islands.

Jebel Zukur is nearly 10 miles long North and South, by 7 miles wide, and 2,047 feet high; close off its northern end is a little islet called High island. At 3 miles eastward of North point, Jebel Zukur, lie the Abu Ail islands, of which the western island is 345 feet high; the channel lies between Jebel Zukur and the Abu Ail islands and is called the Abu Ail channel.

In passing westward of the Zebayir islands, and steaming against a southerly gale, so commonly met with during the winter season, it is advisable to give them a good berth, as the set of the swell is towards the rocks; a ship should keep about a mile clear of them.

From that distance westward of Centre-peak island, the south-western-most of the group, to mid-channel between Jebel Zukur and Abu Ail, the course and distance is S.S.E. $\frac{3}{4}$ E. 66 miles; this course, however, only leads $5\frac{1}{2}$ miles westward of the Avocet rock. Great care should be taken to keep westward of this rock, bearing in mind the repeated cautions given as to the lateral or cross currents so frequently experienced in this sea, and to which, beyond a doubt, the loss of the *Avocet* was due.

The navigable width of the Abu Ail channel is more than 2 miles at the narrowest part, and the mid-channel depths from 40 to 50 fathoms; see page 79. The Hanish group occupy a space extending 18 miles southward of Jebel Zukur, but, after passing East point of that island, one mile distant, a ship's course carries her still further eastward of all the islets of the Hanish group. The course from the centre of the Abu Ail channel to a position 6 miles W.S.W. from Mokha is S. by E. $\frac{5}{8}$ E. 52 miles; this leads $2\frac{1}{2}$ miles eastward of Low island, Little Hanish, and $4\frac{1}{2}$ miles from Mushéjera. As both islands are low and flat, it is best to give them a rather wider berth at night unless the weather is bright and clear.

The high minaret of Mokha, and, next, the town itself, will be seen, as that place is approached. Shoal patches extend nearly 4 miles westward of it, but a depth of not less than 15 fathoms ensures passing outside them. The soundings along this coast are pretty regular, and the lead is a good guide. From off Mokha, a course may be shaped for Perim island. Vessels hugging the shore to avoid the strength of the wind and sea must beware of the shoals lying southward of Zi hill; the Chiltern patch of 3 fathoms, or possibly less, the outer shoal, is fully $2\frac{1}{2}$ miles from the shore and has from 10 to 12 fathoms close to it. If necessary, anchorage may be found in the bay as Ras Bab-el-Mandeb is neared, and there are many anchorages available in the southern part of the Red sea after Jebel Teir is passed.*

* Some of the best anchorages are :—Under Zebayir island, see page 74; at Jebel Zukur, see page 78; at Little and Great Hanish, see page 80; also in Kamaran bay, see page 312; in Mokha road, see page 340; and in the bight between Bab-el-Mandeb and Zi hill, see page 341.

Strait of Bab - el - Mandeb.—In steering for the strait, Ras Bab-el-Mandeb makes as an island, with several peaks, sloping down to a low point on the sea; immediately off the point is Oyster islet with reefs extending 2 cables from its southern and western sides. Perim island will be seen to the right of the peaks when 15 or 20 miles distant; it is of moderate height, its outline even and unbroken, and it has lighthouses at each extreme and on its summit. A dangerous reef extends 2 cables off Azalea point, its south-eastern extreme. The Large strait is on the western side of Perim and is 9 miles wide; the Small strait, through which is the usual and most direct track, is between Perim and Ras Bab-el-Mandeb; the navigable channel for large ships is nearly $1\frac{1}{4}$ miles wide at its narrowest part, and, being well lighted, is, with care, easy of navigation by day or night. Vessels should keep rather nearer to the Perim shore than the centre of the channel, Oyster island being difficult to make out at night owing to the high land behind it; *see* page 230 for detailed description of the strait of Bab-el-Mandeb.

In the passage of this strait it must be remembered that the current becomes very strong at certain seasons, the water running out of the Red sea from June to September, the South-west monsoon season, and into it from November to April, the North-east monsoon season. During the strength of the monsoons it may be expected to run at the rate of 40 miles per diem.

Gulf of Aden.—Having passed through the strait of Bab-el-Mandeb, and, after carefully avoiding the shoal ground extending off shore between Ras al Ará and Ras Kaáu, having touched at or passed Aden, the navigation, from the absence of central islands, shoals, or obstruction of any kind, becomes of a different character to that of the Red sea, and the season of the year with its prevailing monsoon becomes the important consideration. Of mail and all other full-powered steamers, it need only be said that during both seasons they take the direct route to the Persian gulf, Bombay, Colombo, and other Indian ports; and, nearly so, to the Seychelles and Zanzibar.

SMALL - POWERED STEAM - VESSELS. — OUTWARD BOUND.—The track of this class of steamer during the summer or South-west monsoon season is precisely the same through the Red sea, gulf of Aden, and beyond, as that of full-powered vessels, if bound for the Persian gulf or for any of the Indian ports; but, for other parts, they have to accommodate themselves to the prevailing wind as soon as the limit of the South-west monsoon is reached, thus:—

If bound for Seychelles or Zanzibar, and having passed northward of Sokotra, they should stand away to the south-eastward on the starboard tack and cross the equator in about 70° E., or as far westward as the

monsoon permits; from thence, steaming to the southward through the doldrums, to fall in with the South-east trade, which will be met with in from lat. 2° to 4° S., and from thence direct to Seychelles or Zanzibar, making due allowance for the strong northerly set likely to be experienced when approaching the latter island.

In the winter season, when the North-east monsoon of the Arabian sea causes strong south-easterly winds to prevail in the southern part of the Red sea, steam-vessels of small power proceeding to the southward may with advantage pass through the Massawa channel, westward of the Dahalak bank and islands. With this object, they should steer for North Bluff hill on the western shore, when southward of the Sawákin group, and keeping from 2 to 4 miles off shore, steer to the southward, passing inside the foul rocky ground, 7 to 10 miles north-westward of Gannet bank, and westward of the latter shoal, as also of Difnein, on which island there is a light. See also directions, page 180. At 36 miles southward of Difnein is another light on Sheikh ul Abu island, and again at 45 miles farther south-eastward is a light on Shumma island, which latter island lies in the centre of the channel; the passage, called the Narrows, lies between Shumma and the Assarka islands. Until Shumma island is neared, the navigable width of the Massawa channel is from 5 to 8 miles, but in the Narrows it is barely $2\frac{1}{2}$ miles. The depths are moderate, from 40 to 25 fathoms, but deepening to 50 and 60 fathoms as the Narrows are neared and shoaling again in them and after they are passed. In the channel, land and sea breezes are experienced, and, outside their limits, the south-easterly winds blow with less strength than in the central track. See page 178 for detailed description of the Massawa channel.

After passing Shumma, and here the south-easterly swell begins to make itself felt, the channel again opens out, but a vessel should keep as close to the western shore as safety permits, the chart being the best guide, and every advantage should be taken of the lee afforded by headlands, islands, &c., until near the entrance of Asab bay, when it is best to quit the western shore, and passing northward of the Fieramosca shoal, with fore and aft sails set, to cross to the eastern side near Zi hill or as far South as the ship will fetch. From thence, the passage through the strait of Bab-el-Mandeb and as far as Aden is the same as already described for full-powered ships.

In the North-east monsoon, steam-vessels of small power, after passing Aden, should keep close along the Arabian coast. The wind generally blows from about E.N.E., or in the direction of the coast, but its force seldom amounts to 5. If bound to the Persian gulf, they should, if possible, keep to the coast as far as Ras Al-Hadd, using steam and sail and taking every advantage of a shift of wind; and from Ras Al-Hadd stand over to the northern shore of the gulf of Omán. If the monsoon is too

fresh to be faced, proceed as for Bombay, until in about lat. 14° N., long. 69° E., then steam due North to about lat. 19° N.; and from thence on the starboard tack to the Persian gulf.

If bound to Bombay, the coast should be kept aboard as far as the Khorya Morya islands, or beyond them if the monsoon is light there; but, if the monsoon is fresh, the vessel may make sail before reaching the islands and stand to the south-eastward, as the wind will gradually draw to the northward, or westward of North, as the vessel advances eastward, enabling her with steam and sail to head for Bombay.

If bound to Ceylon and the monsoon is fresh, sail may be made from abreast of Ras Fartak, in long. 52° E., though it is desirable to get a little farther north-eastward if possible.

FULL - POWERED STEAMERS.— HOMEWARD BOUND.—Mail and other full-powered steamers from Colombo and the southern ports of India, take the direct route during the South-west monsoon as before stated, passing either northward or southward of Minikoi island light; from thence, northward of Sokótra for Aden and the Red sea.

From Bombay, the direct route is taken by the Peninsula and Oriental Company's steamers and similar vessels, unless the monsoon is unusually strong; at which times they, as well as most moderate-powered vessels, take what is now known as the northern passage. Those of small power take the southern route, hereafter described.

CAUTION.—It is always dangerous to pass near, or attempt to weather, Sokótra in the south-west monsoon; as often the land is shrouded in mist, and the depths are so considerable that the lead gives no warning of proximity to the dangers which extend some distance from the shore. Moreover there is little to be gained, in point of time, by passing close to this island as vessels passing 40 miles north of it only add 8 miles to the distance from Colombo to Aden; no ship should therefore attempt to make the island or pass it within 40 miles, when bound to the westward, more especially in the south-west monsoon.

The Northern passage is about 50 miles longer than the direct route, and is made by keeping on the parallel of Bombay until within about 100 miles of the Arabian coast, from whence the course is shaped along-shore to pass about 20 or 30 miles off the headlands. Between the meridians of 66° and 60° E. the sea and wind appear to be at their height, the sea being very high; westward of 60° , the sea, and then the wind, begin to abate.

The adverse current experienced on this passage averages one knot an hour; eastward of the meridian of 60° , it is from half to three-quarters of a knot, and, westward of 60° , from one to $1\frac{1}{2}$ knots.

At Bab-el-Mandeb, a sailing vessel should, if possible, always pass through the Small strait, as, in case of need, there is anchorage in any part of it; *see* page 231.

Gulf of Aden, Arabian sea, &c.—OUTWARD BOUND.
—S.W. Monsoon.—Sailing vessels bound to Bombay during the South-west monsoon, on leaving the strait of Bab-el-Mandeb, should either keep in the centre, or towards the Arabian shore of the gulf of Aden, in order to avoid the westerly current on the African shore; and, on reaching the South-west monsoon outside the gulf, should steer a direct course for Bombay.

Vessels bound to Ceylon or the bay of Bengal during this monsoon should shape a course to pass through the Eight Degrees or Nine Degrees channel, or on either side of Minikoi island light.

Vessels bound to the Persian gulf will find the South-west monsoon strong along the whole extent of coast to Ras Al-Hadd, except very near the shore, north-eastward of Khorya Morya bay, where the wind is liable to fall light at night.

Those bound to Seychelles, having passed northward of Sokotra, should stand away on the starboard tack, crossing the line if possible in about long. 72° E.; from thence working into the South-east trade, which should be met with in from lat. 2° to 4° S., when they may be put on the port tack for Seychelles.

North-east monsoon.—From the month of September to the month of March, the passage from the Red sea to India or the Persian gulf is very tedious for sailing vessels, and is now seldom attempted. In former times, the passage between Aden and Bombay, when unavoidably taken at this season, frequently occupied from 60 to 90 days.

Vessels leaving the Red sea for India or the Persian gulf during these months should work along the Arabian coast, taking advantage of every shift of wind. Should the current be strong in shore, it is better to stand out 60 or 80 miles from the land; but should the wind be light, advantage should be taken of the tides and land winds in-shore, anchoring when requisite. The current, which generally sets westward, will sometimes set to windward for three or four days together about the full and change of the moon. When off the Khorya Morya islands, or farther north-eastward if she can get there without much difficulty, a vessel may stand to the south-eastward, as the wind will draw to North or westward of North, as the vessel makes casting, enabling her to lay her course for Bombay.

HOMEWARD BOUND.—From Bombay.—South-west monsoon.—It is usual after the setting in of the South-west monsoon for sailing vessels bound from Bombay to Aden and the Red sea to make what is called the southern passage, or to run down south of the

equator into the South-east trade to make their westing. After working out of Bombay harbour into 15 or 20 fathoms water, a vessel may steer down the coast, keeping in soundings of from 40 to 50 fathoms; this is advisable to keep clear of the Laccadive group, in the thick, overcast, rainy weather that may be expected, when observations may not be obtainable for days together. After passing these islands, as little easting as possible should be made, as the South-east trade is fallen in with sooner to the westward than to the eastward. The wind will be from S.W. to W.S.W. with hard westerly and west-north-westerly squalls accompanied by heavy rain. A S.S.E. current of from 20 to 30 miles a day will be experienced.

As the equator is approached, the weather becomes finer and the wind more moderate; and, on the equator, light airs and calms, with cloudy weather, and possibly rain, may be experienced. This weather will continue until the South-east trade is fallen in with, which is generally in from 5° to 6° S. latitude, but it varies; it is sometimes met in 1° S., at others not northward of 8° S. or even 9° S. latitude. A vessel may run down her westing as soon as she is fairly in the trade wind, but vessels are generally obliged to pass southward of the Chagos archipelago.

On getting the South-east trade, a course should be shaped to pass about 100 miles north-eastward of the Seychelles islands, which may be sighted, for a fresh departure. The equator should be re-crossed on the meridian of 53° or 54° E. The trade wind will be steady and strong with fine weather, and carried as far as the equator, gradually veering to South and S.W., continuing moderate until in about lat. 4° N., when the South-west monsoon will increase, and reach its greatest force in about 10° N.

After crossing the equator, a course should be shaped to make the African coast between Ras Hafun and Ras Asir, due allowance being made for the strong north-easterly current which will be experienced on nearing the coast, *see* pages 22 and 37. After rounding Ras Asir, vessels should keep the African shore aboard until Burnt island is reached, when they should steer for Aden. Beating along the African shore against strong westerly and west-south-westerly winds is sometimes tedious, but a vessel should persevere, as she is more likely to get to the westward thus than in the middle of the gulf, or on the Arabian shore.

Vessels should have good sails bent, for the wind frequently blows in severe gusts along the African coast.

A good sailer may work up from Aden to the strait of Bab-el-Mandeb during the South-west monsoon if every advantage is taken, particularly at springs, when the current is liable to change and set westward; the wind, at such times, is also subject to small changes; or, in these months, a quick passage may sometimes be made by keeping near the African

shore until about 60 or 70 miles westward of Burnt island and then crossing over for the straits, or as near to them as the wind will admit; for the passage of the strait, *see* page 231.

From the southern ports of India, sailing vessels bound to the Red sea should stand southward into the South-east trade, and then proceed as from Bombay.

From the Persian gulf, the route is westward of the Laccadive group into the South-east trade, then proceed as from Bombay.

From Zanzibar and Seychelles, sailing vessels may steer direct for Ras Asir, and then proceed as from Bombay.

North-east monsoon.—From November to the end of February, a sailing vessel from Bombay, or any other port on the western coast of India, should steer a direct course to pass between the Arabian coast and the island of Sokótra, and afterwards to fall in with the land about Aden, paying attention to the lead. In these months the North-east monsoon blows fresh, especially westward of Sokótra, and a quick passage may be anticipated.

In March and April, the winds are less constant in the Arabian sea than in the four preceding months, and there are calms at times. In these months, a vessel should steer to pass southward of Sokótra; for, early in April, the North-east monsoon is nearly expended about this island and on the coast of Arabia, and is succeeded by light breezes from S.W. and West, with frequent calms. The current also begins to set strongly to the northward about Sokótra, and between it and the coast of Africa. About and from the latter end of March, therefore, it is advisable to pass about 50 miles southward of that island, in order to fetch Ras Asir with the south-westerly winds which may then be expected.

Leaving Bombay late in April, a vessel should shape a course to pass well southward of Sokótra, in order to make the coast of Africa southward of Ras Asir with the south-westerly wind, which she will probably meet with long before that shore is approached. The land may then be made anywhere between Ras Hafun and Ras Asir, and the remainder of the passage be made as directed for the South-west monsoon.

Sailing vessels bound to the Red sea from Cochin, Calicut, or other ports on the southern part of the Malabar coast, in November, December, January, or February, may steer directly to the westward through the most convenient channel among the Laccadive islands. Those from Cochin should pass southward of Suheli-par, keeping in about lat. $9^{\circ} 30' N.$; but vessels from Mangalore or Kunnanur should pass northward of all the islands. In March and April, the prevailing winds between the Malabar and African coasts being from North to N.W., it is better to keep near the Malabar coast until northward of mount Dilli, and pass northward

of the islands; or, if the Nine Degrees channel is adopted, vessels should pass near Kalpeni and Suheli islands, as the current sets southward towards the Maldive islands in these months.

When clear of the islands, in November, December, January, or February, a course may be shaped to pass on the northern side of Sokotra; but late in March or early in April, it is prudent to keep more to the southward, in lat. 9° or 10° N. as the wind may admit; and, in May, when the South-west monsoon may be expected, it is advisable to keep well to the southward.

From Zanzibar (November to March), a sailing vessel should work to the eastward into the North-west monsoon, keeping as far to the northward as the wind will permit until that monsoon is reached; then run east, edging to the north at the latter part, as far as about long. 68° E., when stand to the northward into the North-east monsoon and thence direct for the gulf of Aden. The same route may be taken from the Seychelles.

Sokotra should be weathered if possible. If efforts are only made to pass south of it there is a great chance of being swept to leeward of Ras Asir, if the monsoon happens to be fresh. If leaving Zanzibar in March a vessel should not go eastward of the Seychelles before standing to the northward, as southerly winds might be expected before reaching Ras Asir.

CIVIL TIME.—In Egypt the official time kept is that of mean noon at the Great Pyramid, or 2h. 4m. 30·5s. fast on Greenwich mean time. The time used by railways and telegraphs, as also at Cairo, and on the Nile, is local mean time of the Abbasizeh observatory, or 2h. 5m. 8·9s. fast on Greenwich.

CHAPTER II.

SUEZ CANAL—ISLANDS AND SHOALS LYING IN
CENTRAL TRACK THROUGH RED SEA.

VARIATION IN 1900.

Gulf of Suez	-	-	-	3° 50' W.
Southern part of Red sea	-	-	-	3° 20' W.

GENERAL REMARKS.—Approaching port Said.—

The coast in the neighbourhood of port Said is unusually low, being out of sight when 3 miles distant. The lighthouse, town, and shipping are the only objects seen from the offing. At six miles to the westward of the lighthouse the coast is marked by fort Ghemil, a low building standing by itself on the low sandy shore. Between fort Ghemil and the Arab village of port Said, are two beacons, situated on the coast about 2 and 4 miles to the eastward of Shemil each in the shape of a column, painted black and white, and surmounted by a ball. The lighthouse, and the two water towers (92 feet high, red, skeleton-shaped, with conical tops) at port Said are conspicuous; and so is the Eastern Exchange, a large, square, red block building with five flagstaffs on its roof; also the offices of the Canal Company. The latter is a white square stone building with three domes. On the shore, about 3 miles eastward of the lighthouse, is a beacon 17 feet high, in the shape of a column, painted with black and white bands, and surmounted by a staff.

Current.—The current off the coast is very uncertain. It generally runs with the wind, from half a mile to $1\frac{1}{2}$ miles an hour. The general set is to the eastward. Owing to this and the low shore, more than usual caution is necessary in approaching the harbour.

Outer anchorage.—The anchorage off port Said is in a sufficient depth of water, according to draught, eastward of the line of the western breakwater, and out of the line of traffic. The bottom is mud and very good holding ground.

PORT SAID HARBOUR* is formed by two concrete breakwaters extending from the sandy shore. A good straight channel about

* The depth here given is generally maintained, dredging being always in progress. The depth throughout the whole length of the canal is $27\frac{1}{4}$ feet, or upwards.

Between 1st April, 1898, and 31st March, 1899, 44 vessels of 25 feet 7 inches draught of water passed through the canal.

See chart, No. 2,573.

50 yards wide at its narrowest part, and having $29\frac{1}{2}$ feet least water, leads from the roadstead to the inner harbour, or Ismail basin, which has a depth of 29 feet. The western breakwater, $1\frac{1}{3}$ miles in length, is for a distance of 427 yards from its root, of solid masonry. With the exception of a short length, situated at 1,094 yards, which is also of solid stonework, the remainder is constructed of blocks of concrete thrown down indiscriminately. Great interstices thus occur, and in winter after heavy gales some blocks are liable to displacement, but these are replaced in the summer.

The eastern breakwater is about one mile long.

A mole, three cables in length, is being constructed for protecting vessels moored in the harbour. It starts from near the shore about 2 cables eastward of the centre of the canal passage, and runs out parallel to the eastern breakwater into a depth of 12 feet. The work as it progresses will be marked by posts rising above the water at intervals, and by floats with red flags.

The inner harbour or Ismail basin is an artificial basin, sub-divided on the western side into three smaller ones, all opening into the harbour; they are named respectively, Commercial, Arsenal, and Cherif. The outer, or Commercial basin, has a depth of $19\frac{1}{2}$ feet; the Arsenal basin $19\frac{1}{2}$ feet; and the Cherif basin from 22 to 24 feet.

Four bollards are placed on the British Admiralty ground on the south side of Ismail basin.

The Africa basin is within the Admiralty ground on the west side of the canal entrance, and is chiefly for the use of vessels staying some time in the port, such as colliers, by which the harbour in front of the town is relieved from being inconveniently crowded. There is a general depth in this basin of 28 feet.

The quarantine establishment is here, on two floating houses. There are two black mooring buoys on the eastern side, at the entrance to the canal, opposite the Admiralty ground, for vessels carrying explosives.

Special area for vessels with Petroleum.—On the east bank, opposite the Africa basin, a small basin has been constructed for the use of vessels laden with petroleum; the entrance is protected by iron floating booms. There is a depth on the floor of this basin of 28 feet. At the southern end of Africa basin there is also a space protected by booms for mooring petroleum vessels.

Caution.—The canal company do not dredge in or round the harbour except in the channel and basins, the depth is continually altering, therefore too great reliance should not be placed on soundings shown on the chart.

The Town is situated on the western side of the inner harbour, and is well laid out, the footway being planted with trees; it is lighted

with gas, but many large houses have electric light. The place has been considerably improved of late years, new government offices, barracks, prison, Roman Catholic church, and offices for the Suez canal company having been built. There is an English hospital, Egyptian government hospital, a Sailors' boarding house and Sailors' rest. The town is supplied with water from Ismailia through pipes laid alongside the canal, a distance of 43 miles.

Parallel with the line of railway which has been laid between Port Said and Ismailia, a fresh-water canal has been constructed. The water in it, however, is said to be often brackish. The charge is 1s. 3d. a ton.

A large area by the cemetery and Arab town, and also to the south of Ismail basin, has been reclaimed from lake Menzaleh.

Population.—The population of port Said is steadily increasing; according to the Census Report of 1897, the number has risen from 19,000 in 1882 to 43,000 in 1897. Nearly three-quarters are natives, the majority being engaged loading and discharging coal, the remainder, about 11,000, are Europeans of almost every nationality. A British consul resides here.

Coal and supplies.—Coal can always be obtained in abundance, and is placed on board in the most expeditious manner from special lighters, the natives employed keeping up a quick and continuous stream with their coal baskets. The Port Said and Suez Canal Company claim to have placed on board the R.M.S. *Caledonia* in 1895 a total quantity of 4,240 tons in 9¼ hours. Coaling is very rarely impeded by weather. Vessels are not coaled alongside a wharf. The amount of coal imported to Port Said and Suez in 1898 was 1,004,096 tons, a decrease of 94,000 tons compared with 1897. The reserve stock kept on shore or in lighters is at times not more than enough for a week's supply. Contract price, 1899, 23s. to 26s. per ton.

Supplies of all kinds can be obtained and water is brought alongside in floating tanks, it is unfiltered, and as a rule condensed water is used for drinking purposes; in summer there is often a difficulty in getting enough to supply passing steamers.

There is a good manufactory for making artificial block ice.

Trade.—The principal articles of export are cigarettes, cotton, and cotton seed; of import, wood, coal, flour, spirits, metals, building materials, machinery, ship chandlery, stores, and petroleum. The number of vessels entering the port in 1897, exclusive of those passing through the canal, was 820. The total British tonnage entered and cleared, was 1,141,437.

Repairs, excepting large castings, can be executed by the Suez Canal Company, who possess a 30-ton floating crane and large smithy with steam hammers of 1½ and 4 tons. Castings up to 3 tons have been made,

See plan, No. 234.

cylinders of 60 to 72 inches diameter cast and bored, and shafting of 12 inches by $15\frac{1}{2}$ feet forged and turned. The firm of Dowdie & Co. are also able to execute the repair of large engines and boilers, &c.

There is no dock accommodation for large ships at Port Said, but there are two patent slips, 150 in length on cradle, which can receive vessels of 300 tons; there are 20 slips for lighters.

Communication.—Port Said is in communication with all parts by steamer and electric telegraph, and is connected with Ismailia by a narrow gauge railway (30 inches), intended only for the conveyance of passengers, mails, and the company's servants. Ismailia is connected by railway with Suez, and also with Cairo, and thereby with the whole railway system of Egypt.

Quarantine.—Plague.—The presence of the first case of bubonic plague at Alexandria was officially declared on May 21, 1899. Hitherto port Said has been entirely free from the disease; but, owing to the impossibility of effectually isolating the town from the rest of Egypt, the quarantine regulations at European ports on all arrivals from this country apply to port Said as well as to Alexandria. Homeward-bound vessels are free to pass through the canal in quarantine, without communicating with the shore, and most of the large mail steamers have begun to do so. See page 88.

Time signal.—From a lattice work iron mast, 30 feet high, erected on the top of the high lighthouse, a time signal is made by a black ball, which is hoisted as preparatory 5 minutes before the signal, and dropped three times daily, at 8 h. 0 m. 0 s. a.m., noon, and 4 h. 0 m. 0 s. p.m., local mean time, equivalent respectively to 17 h. 50 m. 45 s., 21 h. 50 m. 45 s., and 1 h. 50 m. 45 s. Greenwich mean time.

Should the signal fail, a red and white chequered flag is shown from the top of the lighthouse, but the signal is not repeated until the next regular time for making it arrives.

Vessel's chronometers can be compared at any time by application at the Port office.

Position, lat. $31^{\circ} 15' 45''$ N., long. $32^{\circ} 18' 45''$ E.

LIGHTS.—Port Said high lighthouse is a grey, octagonal, concrete tower, situated close to the inshore end of the west breakwater, from which, at a height of 175 feet above high water, a *flashing white* electric light every *three seconds* is exhibited, visible in clear weather from a distance of 20 miles. The lighthouse is surmounted by an iron lattice-work mast, 30 feet high, from which the time signal is made; it is an excellent beacon by day.

West breakwater.—Light-buoys.—A light buoy, showing a *fixed red* light, is moored about 82 yards seaward of the submerged extreme of the western breakwater, in the same line of direction and

bearing N.E. $\frac{1}{2}$ N. about $1\frac{1}{2}$ miles from the high lighthouse. Within this light-buoy at the outer extreme of the part of the breakwater awash, and in the same line of direction, is moored another light-buoy, showing a *fixed white* light. Both these buoys are lighted by stored gas on the Pintsch system.

East breakwater.—At the outer end of the eastern breakwater, a *fixed green* light elevated 21 feet above the sea, is exhibited from a red column 15 feet high; it is only visible at the distance of one mile, being of very small power. In heavy gales this light is not to be depended on.

Central mole.—At the north end of the jetty recently constructed on the eastern side of the entrance to port Said, a provisional *green fixed* light is exhibited, elevated 21 feet above the sea, and visible from a distance of 3 miles. This light is unwatched.

Approach.—Light-buoys.—Gas buoys are moored on either side of the approach to, and of the channel into, Port Said; those on the western side of the channel exhibit *fixed red* lights, and those on the eastern side *fixed green* lights. The lights are elevated 14 feet above the sea.

Vessels bound to port Said, can, by passing between the outer buoys, more readily steer for the main entrance channel, and make proper allowance for the current.

The dredgers' moorings are placed on either side of the fairway channel, just inside the outer pair of buoys.

Lake light.—At rather more than one mile S.W. $\frac{3}{4}$ S. from the high lighthouse, is a wooden lighthouse painted white, standing on the edge of lake Menzaleh, on the side of Africa basin, from which is exhibited at an elevation of 62 feet above high water a *fixed white* light, visible in clear weather at a distance of 8 miles; it is intended as a mark for leading through the dredged channel into port Said, and is obscured when bearing between S. 65° W. and N. 26° W.

Occasional lights.—Lights are shown occasionally from the look-out at the company's office, for aiding the navigation of the canal by night. They consist of one *red* and either one or two *white lights*, the *red* light being either shown alone or placed below the *white* light or lights; they are visible seaward as well as from the canal at a distance of 8 miles.

Mooring buoys.—Several sets of mooring buoys are laid down in the harbour for the use of the numerous mail steamers.

Anchor lights.—Ships made fast in the harbour at port Said, at right angles with the axial line of the port, must show a *white* light as nearly as possible at the extreme end of the ship nearest the navigable channel, at such height that it may be clearly seen by passing ships.

See plan, No. 234.

Tides.—It is high water, full and change, at Port Said at about 10 h. 0 m.; rise 6 to 18 inches, the range being much affected by wind and sea.

Variation of sea level.—Besides the tidal range, the height of the mean sea level at Port Said is found, according to the observations of the canal officials, to vary with the seasons. Thus, in February, after the usual continuance of westerly, southerly, and south-easterly winds, the sea is at its lowest level; and in July, after a continuance of northerly winds, it is at its highest. The mean difference, however, due to these causes does not exceed 8 or 9 inches. Northerly gales occasionally raise the level one foot, and, in rare instances, 2 feet above the previously existing level. During a period of six years, the difference between the highest and lowest levels observed amounted to $4\frac{1}{2}$ feet.

The identity of the mean sea-levels at Suez and Port Said is established. The difference in level between ordinary high and low water at Suez is 3 feet 9 inches; at Port Said 9 inches. The extreme difference caused by contrary winds observed at Suez is 8 feet 6 inches, and at Port Said 4 feet 6 inches. The prevailing winds are from north and north-west.

Directions for entering PORT SAID.—The wooden light-house, painted white, in lake Menzaleh, kept midway between the lines of *red* and *green* gas light-buoys, marking respectively the west and east sides of the channel, bearing S.W. $\frac{1}{4}$ S., leads to the entrance; thence steer in mid-channel between the lines of light-buoys, where there is not less than 29 feet water. Vessels are required to moor head and stern.

Caution.—No heavy draught vessels should attempt to enter Port Said during a westerly gale, especially at night. In strong westerly winds the current rushes past the outer end of the West breakwater, across the channel, and sometimes attains a rate of 4 knots; under the breakwater a weak stream then sets north-eastward. The pilots, when unable to proceed outside, sometimes board in the smoother water under the lee of the breakwater. When pilots cannot board vessels outside, they occasionally come out in a tug and guide them in. It is then for the captain's consideration whether the draught of his vessel admits of his following the tug with safety.

Pilots and signals.—All vessels measuring over 100 tons are bound to take a pilot. The pilot boats carry a blue-peter flag. By night, the canal company's pilot vessel carries three *red* lights vertical at the masthead.

The pilot flag should be hoisted when a pilot is wanted to enter the harbour in the day time, and three globe lights at the fore-topmast-head at night, followed either by rockets, blue lights, or the firing of guns.

The above will be answered from the harbour office :—

If by a rocket - - - Pilot is going out to you.

If by a blue light - - - Pilot cannot go off to you.

Ships in the harbour requiring a pilot hoist three lights at fore-topmast-head ; they must give previous notice of their intention to leave the port.

Caution.—Ships are forbidden to sound steam sirens in any part of the port, and steam whistles are only to be sounded as alarm signals in cases of serious danger. Ships are kept waiting half an hour for a pilot each time of blowing a steam siren or whistle, besides being subject to a fine for a breach of regulations.

Salutes.—Men-of-war are requested not to fire salutes or guns in any part of the port or the canal, according to regulations. Salutes are permitted outside the harbour, and ships saluting the Egyptian flag on entering or leaving the port will have the salute returned by the battery situated on the shore near the western breakwater.

Winds.—South-west gales are the heaviest experienced at port Said, but being off-shore they produce no sea. West, N.W., and North are the prevailing winter winds at port Said and in the canal; the breakwater at the former place affords protection from the sea. During the summer, the sea breezes (from N.E.) are very regular, and blow fresh in the afternoon. From June to August in 1884 a north-westerly breeze was found to set in about 10 a.m. lasting until midnight.

In lake Timsah, during the summer months, the prevailing winds are from N.N.W. to N.E.

The following table, derived from observations made during the years 1880–85 inclusive, shows the average number of days the wind has prevailed from the several directions at port Said :—

Month.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January -	2	3	2	1	3	6	10	3	1
February -	3	2	1	1	2	5	10	4	0
March -	6	5	2	1	2	2	5	7	1
April -	5	6	2	1	2	2	4	8	0
May -	9	6	3	0	1	1	3	7	1
June -	9	5	2	0	1	1	2	9	1
July -	7	3	2	0	0	1	5	12	1
August -	8	3	2	0	0	0	4	13	1
September -	7	4	2	0	0	0	3	13	1
October -	8	8	3	1	0	1	2	7	1
November -	6	4	2	1	1	3	6	6	1
December -	3	4	1	1	3	6	7	4	2
Year -	73	53	24	7	15	28	61	93	11

Barometer.—According to observations made during the same period, the mean annual height of the barometer at Port Said is 29.94 in ;

See plan, No. 234.

the mean monthly height in January (the highest) is 30·06; in July and August (the lowest) 29·79.

Thermometer.—The mean annual temperature at Port Said is 66°·1. The mean monthly height in January and February (the lowest) is 54°; in August (the highest) 77°·7.

During August and September 1882, the temperature in lake Timsah by day was 92° to 98°, by night 76° to 82°. There were dense fogs in September.

Remarks affecting silt at Port Said.—The littoral current from the mouths of the Nile travelling eastward receives a check on striking the western breakwater of Port Said; part of it becomes diverted to the north and passes round the head of the breakwater, whilst a considerable portion used to find its way through the interstices of the loose blocks composing the breakwater, and arriving in still water a deposit of sediment took place, and a bank of sand was thus formed along the inner side of the breakwater.

This bank gradually increased until in the year 1886 there was only about one foot of water where there had been formerly depths of 13 to 16 feet; the interstices in the breakwater between the blocks became closed up with sediment, and the current ceased to pass through, and the only matter held in suspension that escaped into the channel was such as was washed over the breakwater during the heavy gales. A far greater amount of deposit, therefore, now took place along the shore, and a rapid advance of the coast line seaward was the consequence. Where the English hospital is built there was formerly a depth of 7 feet, but by 1897 there was a broad road running parallel to the sea in front of the hospital, and a sandy beach beyond about 50 yards wide. Dredging was carried out in 1887 to clear away the bank formed within the breakwater, and as a result it has again become permeable, the current having forced its way through and the advance of the coastline stopped. The filtration of the sediment takes place at a considerable depth below the surface.*

SUEZ CANAL.—General information.—The Suez canal was first opened to traffic on November 20th, 1869. By an international convention, signed October 24th, 1887, it was declared neutralized. It is exempted from blockade, and vessels of all nations, whether armed or not, are allowed to pass through it either in peace or war.

The entrance is conveniently situated at the inner end of the basins, at Port Said, and its whole length, from the high lighthouse at Port Said to its junction with the Red sea at Suez, is as nearly as possible 87 miles. Of this distance 66 miles are actual canal, and 21 miles of the navigation runs through lake Timsah, and the Great and Little Bitter lakes. Excavations had to be carried out throughout the whole length of lake Timsah, of the

* Remarks chiefly by E. J. Standen, Esq., 1890.

See plan, No. 233.

Little Bitter lake, and a portion of the Great Lake, leaving a distance of only 8 miles in the latter, where the natural depth exceeded that of the canal, and where, consequently, no excavations were necessary.

Width and depth.—The width of the canal at the surface varies, but throughout the greater part of its length is about 320 feet; where the banks are high it is 190 feet, where the banks are low the breadth expands to 330 feet. The narrows occur in the neighbourhood of El Guisr, Serapeum, and Chalouf, and are respectively 8, $5\frac{1}{2}$, and 4 miles in length. Many of the former sharp turnings have been widened, and new gares (sidings) 2,460 feet in length and 49 feet broad, constructed. The width of the floor (originally 72 feet) has been increased throughout to 118 feet, and there is now a general depth through the canal of 27 feet 10 inches. Vessels of 25 feet 7 inches draught are permitted to pass through. The work of widening the canal from 72 to 118 feet, on the floor, ended on December 28th, 1898. The Company hope by 1902 to obtain a depth of $29\frac{1}{2}$ feet throughout the whole length of the canal, with the exception, perhaps, of certain patches of hard rock in the Suez section.

Much larger ships than formerly now use the canal with facility, employing a tug ahead and using their own steam. H.M.S. *Centurion* (1894), length 360 feet, breadth 70 feet, draught 25 feet 3 inches, and of 10,500 tons displacement; H.M.S. *Victorious* (1898), length 390 feet, breadth 75 feet, of 14,900 tons displacement; and the S.S. *Friedrich der Grosse* (1896), 525 feet in length, have passed through the canal. Vessels of the Peninsula and Oriental Steam Navigation Company, 500 feet in length, 54 feet in breadth, and of the maximum draught allowed, are continually passing through the Suez canal.

Buoys, &c.—All beacons and buoys marking the deep water channel of the canal are coloured; black with white tops on the eastern side of the channel, red on the western side. When rocks occur at the edge of the channel, they are marked by small nun buoys with staff and cage.

Mooring bollards are fixed in the banks of the canal about a cable apart; they will bear sufficient strain to cant the largest ship. In the event of getting hard aground, the best shore anchor is found to be a spar buried horizontally on the inner side of the bank with perpendicular planks in front, the hawser being led through a cutting. Many "Gares" or stopping places are provided in the canal, and at each one there is a signal station.

Transit of the canal by night.—This has been allowed since March 1887, and the system of leading lights, light buoys, and beacons is an admirable one. Vessels proceeding at night must be provided with an electric light fitted in accordance with the Company's

See plan, No. 233.

requirements; the majority of vessels obtain the light apparatus from one of the different shipping agents at a uniform rate of £10 for the transit. *See* p. 60.

The introduction of the electric light has had the effect of virtually doubling the carrying capacity of the canal. In 1898, 94 per cent. of the total shipping made part of their passage by aid of the electric light, the average duration of their transit being 17 hours 22 minutes; least time taken 16 hours 36 minutes; whereas the average time taken by steamers navigating by day was 28 hours 20 minutes.

The Canal lights comprise *white* leading lights at the ends of reaches, and at intervals on the banks when the straight portions are long; and *coloured* lights at the curves to guide vessels round them. *Green* lights are on the eastern side of the channel and *red* lights on the western side.

Traffic.—The number of vessels that passed through the canal in the year 1898 was 3,503, the aggregate net tonnage being 9,238,603. Of these vessels, belonging to 20 different nationalities, 2,295 were British (tonnage, 6,297,743), 356 German, 221 French, 193 Dutch, 85 Austrian, 46 Japanese, 48 Russian, 49 Spanish, 74 Italian, and 136 of other nationalities.

The receipts for 1898, 85,294,769 fr., are higher than in any previous year since the opening of the canal in 1869, the nearest approach being in 1891, when they amounted to 83,422,101 fr.

Petroleum vessels.—For distinguishing signals, *see* p. 68.

Fresh-Water Canal.*—A fresh-water canal connects the Nile at Cairo with the Suez canal at Ismailia, on lake Timsah, the connection being effected by means of two locks at Ismailia. About 3 miles before reaching Ismailia, an arm of the fresh-water canal branches off and follows nearly the line of railway and maritime canal to Suez. The depth in the fresh-water canal, which varies with the height of the Nile, is about 4 feet. A branch from this canal has been constructed from Ismailia to port Said.

The northern portion of the Suez canal, between Ismailia and port Said, and the town of port Said itself, are supplied with water from Ismailia, the water being forced by steam machinery through a double row of pipes along the banks of the canal.

DESCRIPTION OF MARITIME CANAL.—From Port Said to Kantara.—The whole of this distance, $24\frac{1}{2}$ miles from abreast of Port Said high lighthouse, with the exception of but one-sixth of a mile, where the ground is higher, the canal runs through the bed of lake Menzaleh, which is now, on the eastern side, a dry, flat,

* During the Egyptian campaign of 1882 this canal was used for the conveyance of supplies to the front.

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Transit of the canal by night.—This has been the case since March 1887, and the system of leading vessels by lights and beacons is an admirable one. Vessels proceeding at night are provided with an electric light fitted in accordance with the regulations.

See plan, No. 2.

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The northern portion of the Suez canal, however Ismailia and the town of port Said itself, are supplied with water from the Nile, the water being forced by steam machinery through a lock at Ismailia and the banks of the canal.

DESCRIPTION OF MARITIME CANAL

Kantara.—The

Said high light

where the ground

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sandy plain, scarcely higher than the level of the water; on the western side it is a little below that level, and, with a "high Nile," is completely overflowed. The *débris* thrown up on the banks here is firm, black sandy mud, protecting the canal from the water in lake Menzaleh without any opening in the whole distance.

From Kantara to the northern end of **Lake Ballah**, $2\frac{1}{4}$ miles.—The canal passes through sand-hills from 20 to 30 feet high.

Lake Ballah, from its northern end to the leading light beyond its southern end, 7 miles.—The canal here passes through a lagoon; the *débris* on either side is of fine sand.

From the leading light southward of **Lake Ballah to Lake Timsah**, $7\frac{1}{2}$ miles.—In this cutting the sand-hills are about 40 feet high. For about 4 miles in the neighbourhood of El Guisr the canal is cut through strata of soft lime or sandstone. The sharp turns between El Guisr and lake Timsah are probably owing to the engineers having followed the softest part of the rock; some of these curves have been considerably reduced of late years by cutting away the more prominent parts of the shore. Ships can pass round the curves under their own steam.

Ismailia, on lake Timsah, the central station in the canal, is well situated for a stopping place; and, off the town, there is anchorage space for a large number of vessels. There is a depth of at least 28 feet water in the middle of the lake, in a Gare sufficiently large for any ship to turn round in. Vessels of 20 feet draught can anchor close in to the pier. Ismailia is connected by railway with Suez and Port Said; also with Cairo, and thus with the general railway system of Egypt.*

Lights.—On the North shore of the lake, from a red pillar on the beach southward of the town, there is exhibited at the height of 33 feet, a *fixed red* light, and on an islet on the west shore of the lake, at the height of 31 feet, another *fixed red* light; the channel through the lake is well marked by the usual light-buoys. The channel here curves through an arc of about 90° , a ship entering the lake from the northward on a S.W. by W. course, and leaving it on a S.E. by S. course.

Through lake Timsah to Toussoum, 5 miles.—The *débris* banks here, of pure sand, like those in lake Ballah, are not sufficiently adhesive to form a barrier between the canal and the lagoons, to keep the silt from running into the channel; the canal is, however, sufficiently wide to allow dredgers to work without stopping the traffic.

* During the Egyptian campaign of 1882, space for upwards of 125 transports (some being of the largest size) was found in lake Timsah. 100 of the vessels were moored head and stern.

Toussoum to North lighthouse, Great Bitter lake, 8½ miles.—In this cutting, the canal is carried through strata of sandstone, except in one place, a mile southward of Serapeum, where it runs through hard gypsum rock.

The Great Bitter lake, from North to South lighthouse, 7¾ miles.—The margin of the deep water in this lake, 1½ miles from its northern entrance, is marked on the eastern side by a red iron pillar lighthouse 40 feet high, showing a *fixed white* light. The excavated channel leading into the deep water is conspicuously marked on each side by light-buoys and by iron beacons 15 feet high, each having a ball 3 feet in diameter on the top.

A light-buoy, painted black, and showing a *fixed white* light, is moored on the line connecting the North and South lighthouses, at the distance of about 3½ miles from the latter.

The margin of the deep water at the southern end of the lake is conspicuously marked on the eastern side by a lighthouse similar to the northern one, showing a *fixed white* light, and by a light-buoy showing a *fixed green* light; on the western side it is marked by a light-buoy showing a *fixed red* light, and in addition by two red conical buoys.

A straight run may be made between the lighthouses for a distance of nearly 8 miles, with not less than 26 feet water; 28 feet may be maintained by passing about two cables westward of this line.

South lighthouse to South end of Little Bitter lake, 10 miles.—The water in this part of the lake being shallower, a cutting has been made giving a depth of 28 feet. The light-buoys mentioned above, showing *green* and *red* lights, mark respectively the eastern and western sides of the entrance to this cutting; thence the channel is well marked by numerous light-buoys and iron beacons on each side, about eight of the latter to a mile, similar to those at the northern end of the lake. Two small black buoys mark the ends of a shoal patch on the west side of the channel situated 4 cables southward of South lighthouse.

South end of Little Bitter lake to the entrance at Port Thewfik, 15 miles nearly.—This part is quite complete with hard banks, and depths of from 28 to 30 feet at low water. At Chalouf the cutting is carried through sandstone; the débris is hard and lumpy. South of lat. 30° 6' N. (one mile south of Chalouf) the canal passes through sand-hills; it increases in width, and the débris on the bank is more than usually large.

At Madama the banks are of firm marl or soft clay. From thence to the south entrance of the canal the débris banks are sand.

The southern end of the canal curves to the south-westward, and extends beyond Suez creek, leaving it, the town of Suez, the dock and

harbour works of port Ibrahim, and the Gare and other works of port Thewfik on the starboard hand, and so out into the gulf of Suez, with not less than 28 feet at low water. A breakwater is carried across the sea face of the bank on the southern side of the entrance, just within the Kad-el-Marakeb shoal.

Port Thewfik is designed to be at the southern entrance to the canal what port Said is at its northern entrance; and, accordingly, considerable works have been carried out, though it is doubtful whether the same necessity for a large port exists at this end of the canal as at the other. The canal company's office and signal station is near the inner end of the Gare of Port Thewfik.

Light-buoys.—The mouth of the canal is marked by four light-buoys and by leading lights, the outer pair of light-buoys, between which ships pass in entering or leaving the canal, being about abreast of the outer end of the breakwater mentioned. The light-buoys on the south-eastern side of the channel show *green* lights; those on the north-western side *red* lights.

Occasional lights.—At the canal company's offices, occasional lights are exhibited to aid in the navigation of the canal by night, consisting of one *red* and either one or two *white* lights; the *red* light may be shown either above or below the *white* light or lights. These lights are visible seaward for a distance of 8 miles.

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Ships secured to the buoys are not allowed to get under way for the roads, before having received a verbal order from the harbour-master.

Tides and currents.—From November to April the general set of the current between Port Said and the Great Bitter lake is to the northward; from June to October, to the southward. The strength of the current depends upon any variation in the height of water in the Mediterranean, which may combine with, or change the direction of, the periodical canal current. The current, as also the height of tide, lessens as the distance from the Bitter lakes diminishes. The maximum strength of the current is seldom more than one knot an hour, though it varies

See plan, No. 233.

from half a knot to 2 knots. There is no perceptible tide or current in the Great Bitter lake or lake Timsah, nor thence to Port Said.*

The tidal influence in the southern portion of the canal extends from port Thewfik to about 4 miles northward of the southern end of the Little Bitter lake, and it is at the latter position that the separation of the salt lake water from the Red sea water occurs.

Between Port Thewfik, at the southern entrance of the canal, and Chalouf, 11 miles to the northward, the tidal stream turns to the northward 2 hours before high water at the entrance, and runs for 7 hours. It commences running to the southward one hour before low water at the entrance, and continues $5\frac{1}{2}$ hours. At full and change, the tidal stream runs North from 9 h. 30 m. to 4 h. 30 m., and South from 4 h. 30 m. to 10 h. 0 m.

The difference in the duration of the northern and southern tidal streams is consequent on the unvarying height of the water in the Bitter lakes; the current cannot run northward until the flood tide at the entrance has risen above the level of the lakes, which is 2 hours before high water; it then turns to run up, and so continues during the latter part of the flood and nearly the whole of the ebb in the bay of Suez, until the water at the entrance has again fallen below the level of the Bitter lakes. It turns to run South one hour before low water, and continues to run out of the canal until the flood tide has again raised the water above the level of the Bitter lakes.

A spring tide rises 6 inches at the southern entrance of the Little Bitter lake, $1\frac{1}{2}$ feet at Chalouf, 2 feet at Madama, and 7 feet at the entrance. With a strong southerly wind in the gulf of Suez, the water rises from 8 to 9 feet at its head, which may then affect the water in the canal to some extent.

In the tidal part of the canal, between Chalouf and port Thewfik, spring tides run at the rate of $2\frac{1}{2}$ knots an hour, and occasionally much stronger. Their strength increases from Chalouf to near Madama, where they are strongest. In passing the mouth of Suez creek, allowance should be made

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That there is at times an interchange of water between the canal and lake Menzaleh is indicated by the fact that in October when, from the overflowing of the Nile, the lake is at its highest and its water freshest, the water in the canal for about 24 miles from Port Said, or as far as Kantara, is not so salt as that of the Mediterranean. From Kantara to within a mile or so from the entrance of the Great Bitter lake, the density in October is only a little above that of ordinary sea water.

In April, when lake Menzaleh is low and salt, the water in the canal north of the Bitter lakes is much saltier than ordinary sea water, and even equals in density that of the Bitter lakes until within 7 or 8 miles of Port Said, when there is a sudden decrease in the saltness of the water which brings it to the same density as that of the Mediterranean.—Navigating-Lieutenant J. C. Richards, H.M.S. *Malabar*, 1872.

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for the strong tidal stream setting across the canal, frequently in the contrary direction of the stream in the canal.

By starting from the entrance an hour before low water, a vessel will arrive in the Bitter lakes before the flood tide overtakes her, and will have had slack water nearly all the way; and it is generally recommended that the tidal part of the canal should be navigated either at slack water or against the tide. Vessels proceeding through with a following stream should guard particularly against touching the canal on either side; as, if the bow touches, they are liable to be swung across the channel and block the canal until the stream turns.

Tide signals.—See page 67.

REGULATIONS for NAVIGATION.—The following amended official regulations for the navigation of the canal were issued in October 1899, and are those now in force.

Art. 1.—On receiving a copy of the present regulations, captains of ships shall bind themselves to abide by, and conform to, these rules in all points, to obey all signals therein mentioned, and satisfy any requisition made in view of the execution of these regulations.

Art. 2.—The transit through the Suez canal is available to ships of all nationalities, provided that their draught of water does not exceed 7·8 metres (25 ft. 7 in. English), and that they conform to the following conditions:—

Sailing vessels above fifty tons must be towed through.

Steam-vessels may pass through the Canal by means of their own steam power, or be towed, subject to the conditions herein-after notified.

The towage of steamers through the canal is not compulsory on the Company; it will be done only when tugboats are available.

Art. 3.—The maximum speed of all ships passing through the canal is fixed at ten kilometres, equal to $5\frac{1}{3}$ nautical miles per hour.

Art. 4.—Every vessel measuring more than one hundred tons gross must employ, either for entering or clearing the ports of Port Said and Port Thewfik, or for passing through the canal, a pilot of the Company, who will furnish all particulars as to the course to be steered.

The captain is held responsible for all groundings and accidents of whatsoever kind, resulting from the management and manœuvring of his ship by day or by night.

Pilots place at the disposal of captains of vessels their experience and practical knowledge of the canal; but, as they cannot be specially acquainted with the defects or peculiarities of each steamer and her machinery, in stopping, steering, &c., the responsibility, as regards the management of the ship, devolves solely upon the captain.

See plan, No. 233.

Art. 5.—When a ship intending to proceed through the canal shall have anchored either at Port Said or Port Thewfik, in the berth appointed by the harbour master, the captain must enter his ship at the Transit Office, and pay all dues for passage, and, when there is occasion, for pilotage,* towage, and berthing; a receipt for the same shall be delivered to him, which will serve as a voucher whenever required.

The following written information must be given by the captain:—

Name and nationality of the ship, to be identified by exhibiting the ship's papers relating thereto.

Name of the captain.

Names of the owners and charterers.

Port of departure.

Port of destination.

Draught of water.

Number of passengers as shown by the passage list.

Statement of crew as shown by the muster roll and its schedules. (Sailors occasionally taken on board vessels passing through the Suez canal are not considered as forming part of the crew, and are taxed in conformity with par. 6, art. 11 of the present regulations.)

Capacity of the ship, according to the legal measurement ascertained, by producing the special canal certificate, or the ship's official papers, established in conformity with the Rules of the International Tonnage Commission, assembled at Constantinople in 1873.

Art. 6.—The Company determine the hour of departure of each ship, and all subsequent stopping and restarting, as well as all other movements of the ship, in such manner as to give full security for the navigation as well as to ensure as much as possible the rapid passage of mail steamers.

Therefore, no ship can demand, as a right, an immediate passage through the canal; neither will any claim be admitted in connection with any delay originating from the foregoing causes.

Unless otherwise ordered, ships engaged upon mail service, under the conditions specified in the next paragraph, happening to be at anchor or stopped in lake Timsah, or at the South Light or North Light berths at the same time with other ships, whether ships of war or merchant ships, are authorised to pass such other ships and to continue their journey first, in their respective order of arrival in the lakes.

Mail steamers, viz., steamers performing a regular mail service under contract with a government, at fixed dates appointed in advance, and having been duly vouched for as such, shall carry at the foremast head by

* For pilotage dues into and out of Port Said harbour, see Art. 13. Since July 1st, 1884, and until further orders, the pilotage dues for the passage through the canal are not charged.

The above will be answered from the harbour office :—

If by a rocket - - - Pilot is going out to you.

If by a blue light - - - Pilot cannot go off to you.

Ships in the harbour requiring a pilot hoist three lights at fore-topmast-head ; they must give previous notice of their intention to leave the port.

Caution.—Ships are forbidden to sound steam sirens in any part of the port, and steam whistles are only to be sounded as alarm signals in cases of serious danger. Ships are kept waiting half an hour for a pilot each time of blowing a steam siren or whistle, besides being subject to a fine for a breach of regulations.

Salutes.—Men-of-war are requested not to fire salutes or guns in any part of the port or the canal, according to regulations. Salutes are permitted outside the harbour, and ships saluting the Egyptian flag on entering or leaving the port will have the salute returned by the battery situated on the shore near the western breakwater.

Winds.—South-west gales are the heaviest experienced at port Said, but being off-shore they produce no sea. West, N.W., and North are the prevailing winter winds at port Said and in the canal ; the breakwater at the former place affords protection from the sea. During the summer, the sea breezes (from N.E.) are very regular, and blow fresh in the afternoon. From June to August in 1884 a north-westerly breeze was found to set in about 10 a.m. lasting until midnight.

In lake Timsah, during the summer months, the prevailing winds are from N.N.W. to N.E.

The following table, derived from observations made during the years 1880–85 inclusive, shows the average number of days the wind has prevailed from the several directions at port Said :—

Month.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
January - -	2	3	2	1	3	6	10	3	1
February - -	3	2	1	1	2	5	10	4	0
March - -	6	5	2	1	2	2	5	7	1
April - -	5	6	2	1	2	2	4	8	0
May - -	9	6	3	0	1	1	3	7	1
June - -	9	5	2	0	1	1	2	9	1
July - -	7	3	2	0	0	1	5	12	1
August - -	8	3	2	0	0	0	4	13	1
September - -	7	4	2	0	0	0	3	13	1
October - -	8	8	3	1	0	1	2	7	1
November - -	6	4	2	1	1	3	6	6	1
December - -	3	4	1	1	3	6	7	4	2
Year - -	73	53	24	7	15	28	61	93	11

Barometer.—According to observations made during the same period, the mean annual height of the barometer at Port Said is 29·94 in ;

See plan, No. 234.

the mean monthly height in January (the highest) is 30·06 ; in July and August (the lowest) 29·79.

Thermometer.—The mean annual temperature at Port Said is 66°·1. The mean monthly height in January and February (the lowest) is 54° ; in August (the highest) 77°·7.

During August and September 1882, the temperature in lake Timsah by day was 92° to 98°, by night 76° to 82°. There were dense fogs in September.

Remarks affecting silt at Port Said.—The littoral current from the mouths of the Nile travelling eastward receives a check on striking the western breakwater of Port Said ; part of it becomes diverted to the north and passes round the head of the breakwater, whilst a considerable portion used to find its way through the interstices of the loose blocks composing the breakwater, and arriving in still water a deposit of sediment took place, and a bank of sand was thus formed along the inner side of the breakwater.

This bank gradually increased until in the year 1886 there was only about one foot of water where there had been formerly depths of 13 to 16 feet ; the interstices in the breakwater between the blocks became closed up with sediment, and the current ceased to pass through, and the only matter held in suspension that escaped into the channel was such as was washed over the breakwater during the heavy gales. A far greater amount of deposit, therefore, now took place along the shore, and a rapid advance of the coast line seaward was the consequence. Where the English hospital is built there was formerly a depth of 7 feet, but by 1897 there was a broad road running parallel to the sea in front of the hospital, and a sandy beach beyond about 50 yards wide. Dredging was carried out in 1887 to clear away the bank formed within the breakwater, and as a result it has again become permeable, the current having forced its way through and the advance of the coastline stopped. The filtration of the sediment takes place at a considerable depth below the surface.*

SUEZ CANAL.—General information.—The Suez canal was first opened to traffic on November 20th, 1869. By an international convention, signed October 24th, 1887, it was declared neutralized. It is exempted from blockade, and vessels of all nations, whether armed or not, are allowed to pass through it either in peace or war.

The entrance is conveniently situated at the inner end of the basins, at Port Said, and its whole length, from the high lighthouse at Port Said to its junction with the Red sea at Suez, is as nearly as possible 87 miles. Of this distance 66 miles are actual canal, and 21 miles of the navigation runs through lake Timsah, and the Great and Little Bitter lakes. Excavations had to be carried out throughout the whole length of lake Timsah, of the

* Remarks chiefly by E. J. Standen, Esq., 1890.

See plan, No. 233.

Little Bitter lake, and a portion of the Great Lake, leaving a distance of only 8 miles in the latter, where the natural depth exceeded that of the canal, and where, consequently, no excavations were necessary.

Width and depth.—The width of the canal at the surface varies, but throughout the greater part of its length is about 320 feet; where the banks are high it is 190 feet, where the banks are low the breadth expands to 330 feet. The narrows occur in the neighbourhood of El Guisr, Serapeum, and Chalouf, and are respectively 8, $5\frac{1}{2}$, and 4 miles in length. Many of the former sharp turnings have been widened, and new gares (sidings) 2,460 feet in length and 49 feet broad, constructed. The width of the floor (originally 72 feet) has been increased throughout to 118 feet, and there is now a general depth through the canal of 27 feet 10 inches. Vessels of 25 feet 7 inches draught are permitted to pass through. The work of widening the canal from 72 to 118 feet, on the floor, ended on December 28th, 1898. The Company hope by 1902 to obtain a depth of $29\frac{1}{2}$ feet throughout the whole length of the canal, with the exception, perhaps, of certain patches of hard rock in the Suez section.

Much larger ships than formerly now use the canal with facility, employing a tug ahead and using their own steam. H.M.S. *Centurion* (1894), length 360 feet, breadth 70 feet, draught 25 feet 3 inches, and of 10,500 tons displacement; H.M.S. *Victorious* (1898), length 390 feet, breadth 75 feet, of 14,900 tons displacement; and the S.S. *Friedrich der Grosse* (1896), 525 feet in length, have passed through the canal. Vessels of the Peninsula and Oriental Steam Navigation Company, 500 feet in length, 54 feet in breadth, and of the maximum draught allowed, are continually passing through the Suez canal.

Buoys, &c.—All beacons and buoys marking the deep water channel of the canal are coloured; black with white tops on the eastern side of the channel, red on the western side. When rocks occur at the edge of the channel, they are marked by small nun buoys with staff and cage.

Mooring bollards are fixed in the banks of the canal about a cable apart; they will bear sufficient strain to cant the largest ship. In the event of getting hard aground, the best shore anchor is found to be a spar buried horizontally on the inner side of the bank with perpendicular planks in front, the hawser being led through a cutting. Many "Gares" or stopping places are provided in the canal, and at each one there is a signal station.

Transit of the canal by night.—This has been allowed since March 1887, and the system of leading lights, light buoys, and beacons is an admirable one. Vessels proceeding at night must be provided with an electric light fitted in accordance with the Company's

See plan, No. 233.

requirements; the majority of vessels obtain the light apparatus from one of the different shipping agents at a uniform rate of £10 for the transit. *See* p. 60.

The introduction of the electric light has had the effect of virtually doubling the carrying capacity of the canal. In 1898, 94 per cent. of the total shipping made part of their passage by aid of the electric light, the average duration of their transit being 17 hours 22 minutes; least time taken 16 hours 36 minutes; whereas the average time taken by steamers navigating by day was 28 hours 20 minutes.

The Canal lights comprise *white* leading lights at the ends of reaches, and at intervals on the banks when the straight portions are long; and *coloured* lights at the curves to guide vessels round them. *Green* lights are on the eastern side of the channel and *red* lights on the western side.

Traffic.—The number of vessels that passed through the canal in the year 1898 was 3,503, the aggregate net tonnage being 9,238,603. Of these vessels, belonging to 20 different nationalities, 2,295 were British (tonnage, 6,297,743), 356 German, 221 French, 193 Dutch, 85 Austrian, 46 Japanese, 48 Russian, 49 Spanish, 74 Italian, and 136 of other nationalities.

The receipts for 1898, 85,294,769 fr., are higher than in any previous year since the opening of the canal in 1869, the nearest approach being in 1891, when they amounted to 83,422,101 fr.

Petroleum vessels.—For distinguishing signals, *see* p. 68.

Fresh-Water Canal.*—A fresh-water canal connects the Nile at Cairo with the Suez canal at Ismailia, on lake Timsah, the connection being effected by means of two locks at Ismailia. About 3 miles before reaching Ismailia, an arm of the fresh-water canal branches off and follows nearly the line of railway and maritime canal to Suez. The depth in the fresh-water canal, which varies with the height of the Nile, is about 4 feet. A branch from this canal has been constructed from Ismailia to port Said.

The northern portion of the Suez canal, between Ismailia and port Said, and the town of port Said itself, are supplied with water from Ismailia, the water being forced by steam machinery through a double row of pipes along the banks of the canal.

DESCRIPTION OF MARITIME CANAL.—From Port Said to Kantara.—The whole of this distance, $24\frac{1}{2}$ miles from abreast of Port Said high lighthouse, with the exception of but one-sixth of a mile, where the ground is higher, the canal runs through the bed of lake Menzaleh, which is now, on the eastern side, a dry, flat,

* During the Egyptian campaign of 1882 this canal was used for the conveyance of supplies to the front.

sandy plain, scarcely higher than the level of the water; on the western side it is a little below that level, and, with a "high Nile," is completely overflowed. The *débris* thrown up on the banks here is firm, black sandy mud, protecting the canal from the water in lake Menzaleh without any opening in the whole distance.

From Kantara to the northern end of **Lake Ballah**, $2\frac{1}{2}$ miles.—The canal passes through sand-hills from 20 to 30 feet high.

Lake Ballah, from its northern end to the leading light beyond its southern end, 7 miles.—The canal here passes through a lagoon; the *débris* on either side is of fine sand.

From the leading light southward of **Lake Ballah** to **Lake Timsah**, $7\frac{1}{2}$ miles.—In this cutting the sand-hills are about 40 feet high. For about 4 miles in the neighbourhood of El Guisr the canal is cut through strata of soft lime or sandstone. The sharp turns between El Guisr and lake Timsah are probably owing to the engineers having followed the softest part of the rock; some of these curves have been considerably reduced of late years by cutting away the more prominent parts of the shore. Ships can pass round the curves under their own steam.

Ismailia, on lake Timsah, the central station in the canal, is well situated for a stopping place; and, off the town, there is anchorage space for a large number of vessels. There is a depth of at least 28 feet water in the middle of the lake, in a Gare sufficiently large for any ship to turn round in. Vessels of 20 feet draught can anchor close in to the pier. Ismailia is connected by railway with Suez and Port Said; also with Cairo, and thus with the general railway system of Egypt.*

Lights.—On the North shore of the lake, from a red pillar on the beach southward of the town, there is exhibited at the height of 33 feet, a *fixed red* light, and on an islet on the west shore of the lake, at the height of 31 feet, another *fixed red* light; the channel through the lake is well marked by the usual light-buoys. The channel here curves through an arc of about 90° , a ship entering the lake from the northward on a S.W. by W. course, and leaving it on a S.E. by S. course.

Through lake Timsah to Toussoum, 5 miles.—The *débris* banks here, of pure sand, like those in lake Ballah, are not sufficiently adhesive to form a barrier between the canal and the lagoons, to keep the silt from running into the channel; the canal is, however, sufficiently wide to allow dredgers to work without stopping the traffic.

* During the Egyptian campaign of 1882, space for upwards of 125 transports (some being of the largest size) was found in lake Timsah. 100 of the vessels were moored head and stern.

Toussoum to North lighthouse, Great Bitter lake, 8½ miles.—In this cutting, the canal is carried through strata of sandstone, except in one place, a mile southward of Serapeum, where it runs through hard gypsum rock.

The Great Bitter lake, from North to South lighthouse, 7¾ miles—The margin of the deep water in this lake, 1½ miles from its northern entrance, is marked on the eastern side by a red iron pillar lighthouse 40 feet high, showing a *fixed white* light. The excavated channel leading into the deep water is conspicuously marked on each side by light-buoys and by iron beacons 15 feet high, each having a ball 3 feet in diameter on the top.

A light-buoy, painted black, and showing a *fixed white* light, is moored on the line connecting the North and South lighthouses, at the distance of about 3½ miles from the latter.

The margin of the deep water at the southern end of the lake is conspicuously marked on the eastern side by a lighthouse similar to the northern one, showing a *fixed white* light, and by a light-buoy showing a *fixed green* light; on the western side it is marked by a light-buoy showing a *fixed red* light, and in addition by two red conical buoys.

A straight run may be made between the lighthouses for a distance of nearly 8 miles, with not less than 26 feet water; 28 feet may be maintained by passing about two cables westward of this line.

South lighthouse to South end of Little Bitter lake, 10 miles.—The water in this part of the lake being shallower, a cutting has been made giving a depth of 28 feet. The light-buoys mentioned above, showing *green* and *red* lights, mark respectively the eastern and western sides of the entrance to this cutting; thence the channel is well marked by numerous light-buoys and iron beacons on each side, about eight of the latter to a mile, similar to those at the northern end of the lake. Two small black buoys mark the ends of a shoal patch on the west side of the channel situated 4 cables southward of South lighthouse.

South end of Little Bitter lake to the entrance at Port Thewfik, 15 miles nearly.—This part is quite complete with hard banks, and depths of from 28 to 30 feet at low water. At Chalouf the cutting is carried through sandstone; the débris is hard and lumpy. South of lat. 30° 6' N. (one mile south of Chalouf) the canal passes through sand-hills; it increases in width, and the débris on the bank is more than usually large.

At Madama the banks are of firm marl or soft clay. From thence to the south entrance of the canal the débris banks are sand.

The southern end of the canal curves to the south-westward, and extends beyond Suez creek, leaving it, the town of Suez, the dock and

harbour works of port Ibrahim, and the Gare and other works of port Thewfik on the starboard hand, and so out into the gulf of Suez, with not less than 28 feet at low water. A breakwater is carried across the sea face of the bank on the southern side of the entrance, just within the Kad-el-Marakeb shoal.

Port Thewfik is designed to be at the southern entrance to the canal what port Said is at its northern entrance; and, accordingly, considerable works have been carried out, though it is doubtful whether the same necessity for a large port exists at this end of the canal as at the other. The canal company's office and signal station is near the inner end of the Gare of Port Thewfik.

Light-buoys.—The mouth of the canal is marked by four light-buoys and by leading lights, the outer pair of light-buoys, between which ships pass in entering or leaving the canal, being about abreast of the outer end of the breakwater mentioned. The light-buoys on the south-eastern side of the channel show *green* lights; those on the north-western side *red* lights.

Occasional lights.—At the canal company's offices, occasional lights are exhibited to aid in the navigation of the canal by night, consisting of one *red* and either one or two *white* lights; the *red* light may be shown either above or below the *white* light or lights. These lights are visible seaward for a distance of 8 miles.

Lights are exhibited at Port Ibrahim by special application to the port office; see p. 87.

Caution.—In thick or hazy weather ships must be careful not to mistake these lights for those of the canal entrance.

Signals.—Flag S of the Code signifies that a pilot of Thewfik roads is required to make the vessel fast to the buoys of the dock. Flag T denotes that a vessel does not intend making fast to the buoys.

Ships secured to the buoys are not allowed to get under way for the roads, before having received a verbal order from the harbour-master.

Tides and currents.—From November to April the general set of the current between Port Said and the Great Bitter lake is to the northward; from June to October, to the southward. The strength of the current depends upon any variation in the height of water in the Mediterranean, which may combine with, or change the direction of, the periodical canal current. The current, as also the height of tide, lessens as the distance from the Bitter lakes diminishes. The maximum strength of the current is seldom more than one knot an hour, though it varies

from half a knot to 2 knots. There is no perceptible tide or current in the Great Bitter lake or lake Timsah, nor thence to Port Said.*

The tidal influence in the southern portion of the canal extends from port Thewfik to about 4 miles northward of the southern end of the Little Bitter lake, and it is at the latter position that the separation of the salt lake water from the Red sea water occurs.

Between Port Thewfik, at the southern entrance of the canal, and Chalouf, 11 miles to the northward, the tidal stream turns to the northward 2 hours before high water at the entrance, and runs for 7 hours. It commences running to the southward one hour before low water at the entrance, and continues $5\frac{1}{2}$ hours. At full and change, the tidal stream runs North from 9 h. 30 m. to 4 h. 30 m., and South from 4 h. 30 m. to 10 h. 0 m.

The difference in the duration of the northern and southern tidal streams is consequent on the unvarying height of the water in the Bitter lakes; the current cannot run northward until the flood tide at the entrance has risen above the level of the lakes, which is 2 hours before high water; it then turns to run up, and so continues during the latter part of the flood and nearly the whole of the ebb in the bay of Suez, until the water at the entrance has again fallen below the level of the Bitter lakes. It turns to run South one hour before low water, and continues to run out of the canal until the flood tide has again raised the water above the level of the Bitter lakes.

A spring tide rises 6 inches at the southern entrance of the Little Bitter lake, $1\frac{1}{2}$ feet at Chalouf, 2 feet at Madama, and 7 feet at the entrance. With a strong southerly wind in the gulf of Suez, the water rises from 8 to 9 feet at its head, which may then affect the water in the canal to some extent.

In the tidal part of the canal, between Chalouf and port Thewfik, spring tides run at the rate of $2\frac{1}{2}$ knots an hour, and occasionally much stronger. Their strength increases from Chalouf to near Madama, where they are strongest. In passing the mouth of Suez creek, allowance should be made

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That there is at times an interchange of water between the canal and lake Menzaleh is indicated by the fact that in October when, from the overflowing of the Nile, the lake is at its highest and its water freshest, the water in the canal for about 24 miles from Port Said, or as far as Kantara, is not so salt as that of the Mediterranean. From Kantara to within a mile or so from the entrance of the Great Bitter lake, the density in October is only a little above that of ordinary sea water.

In April, when lake Menzaleh is low and salt, the water in the canal north of the Bitter lakes is much saltier than ordinary sea water, and even equals in density that of the Bitter lakes until within 7 or 8 miles of Port Said, when there is a sudden decrease in the saltness of the water which brings it to the same density as that of the Mediterranean.—Navigating-Lieutenant J. C. Richards, H.M.S. *Malabar*, 1872.

See plan, No. 233.

for the strong tidal stream setting across the canal, frequently in the contrary direction of the stream in the canal.

By starting from the entrance an hour before low water, a vessel will arrive in the Bitter lakes before the flood tide overtakes her, and will have had slack water nearly all the way; and it is generally recommended that the tidal part of the canal should be navigated either at slack water or against the tide. Vessels proceeding through with a following stream should guard particularly against touching the canal on either side; as, if the bow touches, they are liable to be swung across the channel and block the canal until the stream turns.

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Art. 1.—On receiving a copy of the present regulations, captains of ships shall bind themselves to abide by, and conform to, these rules in all points, to obey all signals therein mentioned, and satisfy any requisition made in view of the execution of these regulations.

Art. 2.—The transit through the Suez canal is available to ships of all nationalities, provided that their draught of water does not exceed 7·8 metres (25 ft. 7 in. English), and that they conform to the following conditions:—

Sailing vessels above fifty tons must be towed through.

Steam-vessels may pass through the Canal by means of their own steam power, or be towed, subject to the conditions herein-after notified.

The towage of steamers through the canal is not compulsory on the Company; it will be done only when tugboats are available.

Art. 3.—The maximum speed of all ships passing through the canal is fixed at ten kilometres, equal to $5\frac{1}{2}$ nautical miles per hour.

Art. 4.—Every vessel measuring more than one hundred tons gross must employ, either for entering or clearing the ports of Port Said and Port Thewfik, or for passing through the canal, a pilot of the Company, who will furnish all particulars as to the course to be steered.

The captain is held responsible for all groundings and accidents of whatsoever kind, resulting from the management and manœuvring of his ship by day or by night.

Pilots place at the disposal of captains of vessels their experience and practical knowledge of the canal; but, as they cannot be specially acquainted with the defects or peculiarities of each steamer and her machinery, in stopping, steering, &c., the responsibility, as regards the management of the ship, devolves solely upon the captain.

Art. 5.—When a ship intending to proceed through the canal shall have anchored either at Port Said or Port Thewfik, in the berth appointed by the harbour master, the captain must enter his ship at the Transit Office, and pay all dues for passage, and, when there is occasion, for pilotage,* towage, and berthing; a receipt for the same shall be delivered to him, which will serve as a voucher whenever required.

The following written information must be given by the captain:—

Name and nationality of the ship, to be identified by exhibiting the ship's papers relating thereto.

Name of the captain.

Names of the owners and charterers.

Port of departure.

Port of destination.

Draught of water.

Number of passengers as shown by the passage list.

Statement of crew as shown by the muster roll and its schedules. (Sailors occasionally taken on board vessels passing through the Suez canal are not considered as forming part of the crew, and are taxed in conformity with par. 6, art. 11 of the present regulations.)

Capacity of the ship, according to the legal measurement ascertained, by producing the special canal certificate, or the ship's official papers, established in conformity with the Rules of the International Tonnage Commission, assembled at Constantinople in 1873.

Art. 6.—The Company determine the hour of departure of each ship, and all subsequent stopping and restarting, as well as all other movements of the ship, in such manner as to give full security for the navigation as well as to ensure as much as possible the rapid passage of mail steamers.

Therefore, no ship can demand, as a right, an immediate passage through the canal; neither will any claim be admitted in connection with any delay originating from the foregoing causes.

Unless otherwise ordered, ships engaged upon mail service, under the conditions specified in the next paragraph, happening to be at anchor or stopped in lake Timsah, or at the South Light or North Light berths at the same time with other ships, whether ships of war or merchant ships, are authorised to pass such other ships and to continue their journey first, in their respective order of arrival in the lakes.

Mail steamers, viz., steamers performing a regular mail service under contract with a government, at fixed dates appointed in advance, and having been duly vouched for as such, shall carry at the foremast head by

* For pilotage dues into and out of Port Said harbour, see Art. 13. Since July 1st, 1884, and until further orders, the pilotage dues for the passage through the canal are not charged.

day a blue signal with the letter P cut out in blank in the centre, and by night a *white* light.

Art. 7.—All ships ready to enter the canal must have their yards braced forward, their jib-booms run in and their boats swinging inboard. In addition to their two bow anchors, they must carry at the stern ready for letting go at the request of the pilot, a strong kedge with a stout hawser bent on, sufficient to hold the ship.

Art. 8.—Sec. 1. Every ship must, during her passage through the canal, have either in tow or ready to lower, a boat fully equipped carrying a hawser in readiness to be run out at once and made fast to one of the mooring posts on either side of the canal.

Sec. 2. The captain must set a watch both by day and night; the men to be in readiness to ease away or cut hawsers as may be required.

All ships whether made fast in a siding, or moored at any point, or aground in the canal, shall ease their hawsers in order to give free passage to tugs, steam launches, hopper-barges, and any other craft of a light draught, that may have to pass them.

Sec. 3. All steamers, tugs included, must blow their whistles when approaching the curves of the canal, also when approaching in either direction boats or lighters, dredgers, or any craft afloat. They must stop when the channel is not clear, and pass at a reduced speed all sidings, stone or earth-work yards; they must also slacken speed and have their two bow anchors ready for letting go when passing vessels made fast or under way, hopper-barges, dredgers, or any other craft.

Sec. 4. Whenever a collision appears probable, no ship must hesitate to run aground and thus avoid the collision. The expenses consequent upon grounding under these circumstances shall be defrayed by the ship in fault.

Sec. 5. Ships proceeding in the same direction are not allowed to pass each other under way in the canal.

In the case of a ship being allowed to pass another one ahead of her, she must conform with the Company's directions to that effect.

Sec. 6. Navigation of sailing craft of every description at night is entirely forbidden.

Sec. 7. Steamers intending to go through the canal at night must first satisfy the agents of the Company in Port Said, or Port Thewfik, that they are provided :—

(1.) With an electric search-light or search-lights showing the channel 1,200 metres (1,312 yards) ahead, and so constructed as to admit of rapid splitting up of the beam of rays into two separate segments with a dark sector in the middle.

See plan, No. 233.

(2.) With electric lights powerful enough to light up a circular area of about 200 metres (219 yards) diameter, around the ship.

The agents of the Company will decide whether the apparatus fulfil the requirements of the regulations, so that ships provided with them may, without inconvenience, be authorised to navigate the canal at night.

Night transit may, however, be suspended in case of failure or want of power in the lights.*

Sec. 8. While navigating by night, ships must carry their usual lights and have a man on the look-out forward.

Whenever a vessel navigating by night has made fast, whether in a siding or in the canal, she must, thereupon, at once extinguish her search-light or search-lights, and lights above stated, as well as her course lights, and show four white lights on the side where the channel is clear, one light at the stem, one light on the bulwarks one-third the distance from the stem to the stern, another light on the bulwarks two-thirds the distance from the stem to the stern, and the fourth light at the stern.

All ships navigating at night in the Large Bitter lake between the North and South lights must extinguish their search-light or search-lights.

Any ship coming into Port Said at night from the south must extinguish her search-light or search-lights when making the curve from the canal into the harbour.

Sec. 9. Whenever a ship navigating at night is accidentally stopped on her way, her white light astern must at once be replaced by a red light. In case other vessels are following her she must, at the same time, sound her steam-whistle four or five times in quick succession, repeating this at a few moments' interval until the ship following her repeats this signal, which shall be taken as an order to slacken speed at once with a view to stopping, if need be.

Sec. 10. Whenever a ship makes fast, enters a siding, or gets aground, the captain must give immediate notice thereof by means of the signals specified in the appendix to these regulations. (*See p. 67.*)

Sec. 11. Navigation at night by steamers unprovided with electric light is only authorised under exceptional circumstances, the captain accepting entire responsibility in writing for any delay, mishap, and damages that may happen to his own ship, as well as for any similar accidents he may cause to other ships in transit, or to the Company's craft and plant happening to be in the canal. Ships navigating under these conditions remain subject to all other rules regarding night transit.

Art. 9. In the event of grounding, the agents of the Company alone shall have the right to direct all operations by which a vessel is to be floated off again, to unload and tow the vessel as may be necessary, by means of the plant and stock which the Company has at hand, at the

* Electric light apparatus can be hired at either end of the canal, *see p. 53.*

See plan, No. 233.

sandy plain, scarcely higher than the level of the water; on the western side it is a little below that level, and, with a "high Nile," is completely overflowed. The débris thrown up on the banks here is firm, black sandy mud, protecting the canal from the water in lake Menzaleh without any opening in the whole distance.

From Kantara to the northern end of **Lake Ballah**, $2\frac{1}{4}$ miles.—The canal passes through sand-hills from 20 to 30 feet high.

Lake Ballah, from its northern end to the leading light beyond its southern end, 7 miles.—The canal here passes through a lagoon; the débris on either side is of fine sand.

From the leading light southward of **Lake Ballah** to **Lake Timsah**, $7\frac{1}{2}$ miles.—In this cutting the sand-hills are about 40 feet high. For about 4 miles in the neighbourhood of El Guisr the canal is cut through strata of soft lime or sandstone. The sharp turns between El Guisr and lake Timsah are probably owing to the engineers having followed the softest part of the rock; some of these curves have been considerably reduced of late years by cutting away the more prominent parts of the shore. Ships can pass round the curves under their own steam.

Ismailia, on lake Timsah, the central station in the canal, is well situated for a stopping place; and, off the town, there is anchorage space for a large number of vessels. There is a depth of at least 28 feet water in the middle of the lake, in a Gare sufficiently large for any ship to turn round in. Vessels of 20 feet draught can anchor close in to the pier. Ismailia is connected by railway with Suez and Port Said; also with Cairo, and thus with the general railway system of Egypt.*

Lights.—On the North shore of the lake, from a red pillar on the beach southward of the town, there is exhibited at the height of 33 feet, a *fixed red* light, and on an islet on the west shore of the lake, at the height of 31 feet, another *fixed red* light; the channel through the lake is well marked by the usual light-buoys. The channel here curves through an arc of about 90° , a ship entering the lake from the northward on a S.W. by W. course, and leaving it on a S.E. by S. course.

Through lake Timsah to **Toussoum**, 5 miles.—The débris banks here, of pure sand, like those in lake Ballah, are not sufficiently adhesive to form a barrier between the canal and the lagoons, to keep the silt from running into the channel; the canal is, however, sufficiently wide to allow dredgers to work without stopping the traffic.

* During the Egyptian campaign of 1882, space for upwards of 125 transports (some being of the largest size) was found in lake Timsah. 100 of the vessels were moored head and stern.

See plan, No. 233.

Toussoum to North lighthouse, Great Bitter lake, 8½ miles.—In this cutting, the canal is carried through strata of sandstone, except in one place, a mile southward of Serapeum, where it runs through hard gypsum rock.

The Great Bitter lake, from North to South lighthouse, 7¾ miles—The margin of the deep water in this lake, 1½ miles from its northern entrance, is marked on the eastern side by a red iron pillar lighthouse 40 feet high, showing a *fixed white* light. The excavated channel leading into the deep water is conspicuously marked on each side by light-buoys and by iron beacons 15 feet high, each having a ball 3 feet in diameter on the top.

A light-buoy, painted black, and showing a *fixed white* light, is moored on the line connecting the North and South lighthouses, at the distance of about 3½ miles from the latter.

The margin of the deep water at the southern end of the lake is conspicuously marked on the eastern side by a lighthouse similar to the northern one, showing a *fixed white* light, and by a light-buoy showing a *fixed green* light; on the western side it is marked by a light-buoy showing a *fixed red* light, and in addition by two red conical buoys.

A straight run may be made between the lighthouses for a distance of nearly 8 miles, with not less than 26 feet water; 28 feet may be maintained by passing about two cables westward of this line.

South lighthouse to South end of Little Bitter lake, 10 miles.—The water in this part of the lake being shallower, a cutting has been made giving a depth of 28 feet. The light-buoys mentioned above, showing *green* and *red* lights, mark respectively the eastern and western sides of the entrance to this cutting; thence the channel is well marked by numerous light-buoys and iron beacons on each side, about eight of the latter to a mile, similar to those at the northern end of the lake. Two small black buoys mark the ends of a shoal patch on the west side of the channel situated 4 cables southward of South lighthouse.

South end of Little Bitter lake to the entrance at Port Thewfik, 15 miles nearly.—This part is quite complete with hard banks, and depths of from 28 to 30 feet at low water. At Chalouf the cutting is carried through sandstone; the débris is hard and lumpy. South of lat. 30° 6' N. (one mile south of Chalouf) the canal passes through sand-hills; it increases in width, and the débris on the bank is more than usually large.

At Madama the banks are of firm marl or soft clay. From thence to the south entrance of the canal the débris banks are sand.

The southern end of the canal curves to the south-westward, and extends beyond Suez creek, leaving it, the town of Suez, the dock and

harbour works of port Ibrahim, and the Gare and other works of port Thewfik on the starboard hand, and so out into the gulf of Suez, with not less than 28 feet at low water. A breakwater is carried across the sea face of the bank on the southern side of the entrance, just within the Kad-el-Marakeb shoal.

Port Thewfik is designed to be at the southern entrance to the canal what port Said is at its northern entrance; and, accordingly, considerable works have been carried out, though it is doubtful whether the same necessity for a large port exists at this end of the canal as at the other. The canal company's office and signal station is near the inner end of the Gare of Port Thewfik.

Light-buoys.—The mouth of the canal is marked by four light-buoys and by leading lights, the outer pair of light-buoys, between which ships pass in entering or leaving the canal, being about abreast of the outer end of the breakwater mentioned. The light-buoys on the south-eastern side of the channel show *green* lights; those on the north-western side *red* lights.

Occasional lights.—At the canal company's offices, occasional lights are exhibited to aid in the navigation of the canal by night, consisting of one *red* and either one or two *white* lights; the *red* light may be shown either above or below the *white* light or lights. These lights are visible seaward for a distance of 8 miles.

Lights are exhibited at Port Ibrahim by special application to the port office; see p. 87.

Caution.—In thick or hazy weather ships must be careful not to mistake these lights for those of the canal entrance.

Signals.—Flag S of the Code signifies that a pilot of Thewfik roads is required to make the vessel fast to the buoys of the dock. Flag T denotes that a vessel does not intend making fast to the buoys.

Ships secured to the buoys are not allowed to get under way for the roads, before having received a verbal order from the harbour-master.

Tides and currents.—From November to April the general set of the current between Port Said and the Great Bitter lake is to the northward; from June to October, to the southward. The strength of the current depends upon any variation in the height of water in the Mediterranean, which may combine with, or change the direction of, the periodical canal current. The current, as also the height of tide, lessens as the distance from the Bitter lakes diminishes. The maximum strength of the current is seldom more than one knot an hour, though it varies

See plan, No. 233.

from half a knot to 2 knots. There is no perceptible tide or current in the Great Bitter lake or lake Timsah, nor thence to Port Said.*

The tidal influence in the southern portion of the canal extends from port Thewfik to about 4 miles northward of the southern end of the Little Bitter lake, and it is at the latter position that the separation of the salt lake water from the Red sea water occurs.

Between Port Thewfik, at the southern entrance of the canal, and Chalouf, 11 miles to the northward, the tidal stream turns to the northward 2 hours before high water at the entrance, and runs for 7 hours. It commences running to the southward one hour before low water at the entrance, and continues 5½ hours. At full and change, the tidal stream runs North from 9 h. 30 m. to 4 h. 30 m., and South from 4 h. 30 m. to 10 h. 0 m.

The difference in the duration of the northern and southern tidal streams is consequent on the unvarying height of the water in the Bitter lakes; the current cannot run northward until the flood tide at the entrance has risen above the level of the lakes, which is 2 hours before high water; it then turns to run up, and so continues during the latter part of the flood and nearly the whole of the ebb in the bay of Suez, until the water at the entrance has again fallen below the level of the Bitter lakes. It turns to run South one hour before low water, and continues to run out of the canal until the flood tide has again raised the water above the level of the Bitter lakes.

A spring tide rises 6 inches at the southern entrance of the Little Bitter lake, 1½ feet at Chalouf, 2 feet at Madama, and 7 feet at the entrance. With a strong southerly wind in the gulf of Suez, the water rises from 8 to 9 feet at its head, which may then affect the water in the canal to some extent.

In the tidal part of the canal, between Chalouf and port Thewfik, spring tides run at the rate of 2½ knots an hour, and occasionally much stronger. Their strength increases from Chalouf to near Madama, where they are strongest. In passing the mouth of Suez creek, allowance should be made

* From November to April the river Nile is falling, and from June to October it is rising; these periods coincide with those of the opposite currents in the canal here described, but there is not sufficient evidence to prove that the Nile causes them.

That there is at times an interchange of water between the canal and lake Menzaleh is indicated by the fact that in October when, from the overflowing of the Nile, the lake is at its highest and its water freshest, the water in the canal for about 24 miles from Port Said, or as far as Kantara, is not so salt as that of the Mediterranean. From Kantara to within a mile or so from the entrance of the Great Bitter lake, the density in October is only a little above that of ordinary sea water.

In April, when lake Menzaleh is low and salt, the water in the canal north of the Bitter lakes is much saltier than ordinary sea water, and even equals in density that of the Bitter lakes until within 7 or 8 miles of Port Said, when there is a sudden decrease in the saltness of the water which brings it to the same density as that of the Mediterranean.—Navigating-Lieutenant J. C. Richards, H.M.S. *Malabar*, 1872.

See plan, No. 233.

for the strong tidal stream setting across the canal, frequently in the contrary direction of the stream in the canal.

By starting from the entrance an hour before low water, a vessel will arrive in the Bitter lakes before the flood tide overtakes her, and will have had slack water nearly all the way; and it is generally recommended that the tidal part of the canal should be navigated either at slack water or against the tide. Vessels proceeding through with a following stream should guard particularly against touching the canal on either side; as, if the bow touches, they are liable to be swung across the channel and block the canal until the stream turns.

Tide signals.—See page 67.

REGULATIONS for NAVIGATION.—The following amended official regulations for the navigation of the canal were issued in October 1899, and are those now in force.

Art. 1.—On receiving a copy of the present regulations, captains of ships shall bind themselves to abide by, and conform to, these rules in all points, to obey all signals therein mentioned, and satisfy any requisition made in view of the execution of these regulations.

Art. 2.—The transit through the Suez canal is available to ships of all nationalities, provided that their draught of water does not exceed 7·8 metres (25 ft. 7 in. English), and that they conform to the following conditions :—

Sailing vessels above fifty tons must be towed through.

Steam-vessels may pass through the Canal by means of their own steam power, or be towed, subject to the conditions herein-after notified.

The towage of steamers through the canal is not compulsory on the Company; it will be done only when tugboats are available.

Art. 3.—The maximum speed of all ships passing through the canal is fixed at ten kilometres, equal to $5\frac{1}{3}$ nautical miles per hour.

Art. 4.—Every vessel measuring more than one hundred tons gross must employ, either for entering or clearing the ports of Port Said and Port Thewfik, or for passing through the canal, a pilot of the Company, who will furnish all particulars as to the course to be steered.

The captain is held responsible for all groundings and accidents of whatsoever kind, resulting from the management and manœuvring of his ship by day or by night.

Pilots place at the disposal of captains of vessels their experience and practical knowledge of the canal; but, as they cannot be specially acquainted with the defects or peculiarities of each steamer and her machinery, in stopping, steering, &c., the responsibility, as regards the management of the ship, devolves solely upon the captain.

Art. 5.—When a ship intending to proceed through the canal shall have anchored either at Port Said or Port Thewfik, in the berth appointed by the harbour master, the captain must enter his ship at the Transit Office, and pay all dues for passage, and, when there is occasion, for pilotage,* towage, and berthing; a receipt for the same shall be delivered to him, which will serve as a voucher whenever required.

The following written information must be given by the captain:—

Name and nationality of the ship, to be identified by exhibiting the ship's papers relating thereto.

Name of the captain.

Names of the owners and charterers.

Port of departure.

Port of destination.

Draught of water.

Number of passengers as shown by the passage list.

Statement of crew as shown by the muster roll and its schedules. (Sailors occasionally taken on board vessels passing through the Suez canal are not considered as forming part of the crew, and are taxed in conformity with par. 6, art. 11 of the present regulations.)

Capacity of the ship, according to the legal measurement ascertained, by producing the special canal certificate, or the ship's official papers, established in conformity with the Rules of the International Tonnage Commission, assembled at Constantinople in 1873.

Art. 6.—The Company determine the hour of departure of each ship, and all subsequent stopping and restarting, as well as all other movements of the ship, in such manner as to give full security for the navigation as well as to ensure as much as possible the rapid passage of mail steamers.

Therefore, no ship can demand, as a right, an immediate passage through the canal; neither will any claim be admitted in connection with any delay originating from the foregoing causes.

Unless otherwise ordered, ships engaged upon mail service, under the conditions specified in the next paragraph, happening to be at anchor or stopped in lake Timsah, or at the South Light or North Light berths at the same time with other ships, whether ships of war or merchant ships, are authorised to pass such other ships and to continue their journey first, in their respective order of arrival in the lakes.

Mail steamers, viz., steamers performing a regular mail service under contract with a government, at fixed dates appointed in advance, and having been duly vouched for as such, shall carry at the foremast head by

* For pilotage dues into and out of Port Said harbour, *see* Art. 13. Since July 1st, 1884, and until further orders, the pilotage dues *for the passage through the canal* are not charged.

day a blue signal with the letter P cut out in blank in the centre, and by night a *white* light.

Art. 7.—All ships ready to enter the canal must have their yards braced forward, their jib-booms run in and their boats swinging inboard. In addition to their two bow anchors, they must carry at the stern ready for letting go at the request of the pilot, a strong kedje with a stout hawser bent on, sufficient to hold the ship.

Art. 8.—Sec. 1. Every ship must, during her passage through the canal, have either in tow or ready to lower, a boat fully equipped carrying a hawser in readiness to be run out at once and made fast to one of the mooring posts on either side of the canal.

Sec. 2. The captain must set a watch both by day and night; the men to be in readiness to ease away or cut hawsers as may be required.

All ships whether made fast in a siding, or moored at any point, or aground in the canal, shall ease their hawsers in order to give free passage to tugs, steam launches, hopper-barges, and any other craft of a light draught, that may have to pass them.

Sec. 3. All steamers, tugs included, must blow their whistles when approaching the curves of the canal, also when approaching in either direction boats or lighters, dredgers, or any craft afloat. They must stop when the channel is not clear, and pass at a reduced speed all sidings, stone or earth-work yards; they must also slacken speed and have their two bow anchors ready for letting go when passing vessels made fast or under way, hopper-barges, dredgers, or any other craft.

Sec. 4. Whenever a collision appears probable, no ship must hesitate to run aground and thus avoid the collision. The expenses consequent upon grounding under these circumstances shall be defrayed by the ship in fault.

Sec. 5. Ships proceeding in the same direction are not allowed to pass each other under way in the canal.

In the case of a ship being allowed to pass another one ahead of her, she must conform with the Company's directions to that effect.

Sec. 6. Navigation of sailing craft of every description at night is entirely forbidden.

Sec. 7. Steamers intending to go through the canal at night must first satisfy the agents of the Company in Port Said, or Port Thewfik, that they are provided :—

(1.) With an electric search-light or search-lights showing the channel 1,200 metres (1,312 yards) ahead, and so constructed as to admit of rapid splitting up of the beam of rays into two separate segments with a dark sector in the middle.

(2.) With electric lights powerful enough to light up a circular area of about 200 metres (219 yards) diameter, around the ship.

The agents of the Company will decide whether the apparatus fulfil the requirements of the regulations, so that ships provided with them may, without inconvenience, be authorised to navigate the canal at night.

Night transit may, however, be suspended in case of failure or want of power in the lights.*

Sec. 8. While navigating by night, ships must carry their usual lights and have a man on the look-out forward.

Whenever a vessel navigating by night has made fast, whether in a siding or in the canal, she must, thereupon, at once extinguish her search-light or search-lights, and lights above stated, as well as her course lights, and show four white lights on the side where the channel is clear, one light at the stem, one light on the bulwarks one-third the distance from the stem to the stern, another light on the bulwarks two-thirds the distance from the stem to the stern, and the fourth light at the stern.

All ships navigating at night in the Large Bitter lake between the North and South lights must extinguish their search-light or search-lights.

Any ship coming into Port Said at night from the south must extinguish her search-light or search-lights when making the curve from the canal into the harbour.

Sec. 9. Whenever a ship navigating at night is accidentally stopped on her way, her white light astern must at once be replaced by a red light. In case other vessels are following her she must, at the same time, sound her steam-whistle four or five times in quick succession, repeating this at a few moments' interval until the ship following her repeats this signal, which shall be taken as an order to slacken speed at once with a view to stopping, if need be.

Sec. 10. Whenever a ship makes fast, enters a siding, or gets aground, the captain must give immediate notice thereof by means of the signals specified in the appendix to these regulations. (See p. 67.)

Sec. 11. Navigation at night by steamers unprovided with electric light is only authorised under exceptional circumstances, the captain accepting entire responsibility in writing for any delay, mishap, and damages that may happen to his own ship, as well as for any similar accidents he may cause to other ships in transit, or to the Company's craft and plant happening to be in the canal. Ships navigating under these conditions remain subject to all other rules regarding night transit.

Art. 9. In the event of grounding, the agents of the Company alone shall have the right to direct all operations by which a vessel is to be floated off again, to unload and tow the vessel as may be necessary, by means of the plant and stock which the Company has at hand, at the

* Electric light apparatus can be hired at either end of the canal, see p. 53.

See plan, No. 233.

expense of the vessel, unless it be regularly proved that there was an insufficient depth of water in the canal, or that erroneous direction by the pilot had caused the grounding.

The aforesaid costs of floating, towing, discharging, and re-loading, &c., must be paid conformably with a statement or estimate drawn up by the Company, before the departure of the ship from Port Said or Port Thewfik.*

All manœuvres with the object of helping grounded vessels to get off are formally prohibited to other ships in transit.

Art. 10.—The following acts are prohibited :—

1. The overloading of the deck, before entering the canal, with coals or other merchandise which might alter the general stability of the vessels or would interfere with navigation.

2. The anchoring of a ship in the canal, except through unavoidable circumstances, and then only with the consent of the pilot.

3. Throwing overboard in the ports, and during the journey from sea to sea, and at any point whatever of such journey, earth, ashes, cinders, or material of any kind.

4. Picking up, without the direct intervention of the Company's agents, anything that may have fallen into the canal.

Should any material of whatever kind fall overboard, the circumstances are to be immediately made known to the pilot, who is instructed to transmit such information to the Company's agent at the nearest station.

The recovery of all articles dropped into the canal, in whatever way such salvage is effected, shall be carried out at the expense of the captain, to whom such articles will be restored on reimbursement of the said expense.

5. It is expressly forbidden, and on penalty of legal proceedings, to masters of ships while in the canal or in the ports or sidings thereunto appertaining, to allow any guns to be fired from on board their ships.

* From the 1st of October, 1883, and until further orders, whenever a ship going through the canal happens, except in the roads and ports, to ground or stop in consequence of an accident independent of collision, the Company, in order to remove the obstruction in the fairway with all possible speed, and to hasten the restarting of the grounded or stopped ship, will not claim from the captains, the consignees, or the shipowners, the reimbursement of the expenses incurred in refloating the ship, and, if deemed necessary, for towing her as far as the next siding. If from such siding the ship continues her journey in tow, she must pay towage charges according to rates annexed to the present regulations.

It is moreover well understood that ships will have to bear all expenses incurred for the necessary repairs or putting into condition with a view to remedy such damages as might interfere with their restarting, whatever be the time at which these damages may have occurred, and that the said ships will remain responsible for the damages which may be the consequence of their grounding.

The Company will continue to perform the work of refloating the grounded ships under the supervision of their officers exclusively, and will use first the means available on board, and afterwards or simultaneously the machinery or appliances belonging to the Company.

See plan, No. 233.

6. They are forbidden to sound their steam-whistle in the ports of the canal, except as an alarm signal in case of serious danger.

7. Burial in the banks of the canal is forbidden.

Art. II.—Sec. 1. The net tonnage resulting from the system of measurement laid down by the International Commission of Constantinople, and inscribed on the special certificates issued by the competent authorities, or on the ship's official papers, is the basis for levying the special navigation due, which is at present nine francs.

In levying the dues, any alteration of net tonnage subsequent to the delivery of the above-mentioned certificate or papers, shall be taken into account.

Sec. 2. The canal authorities may ascertain whether cargo or passengers are carried in any spaces which, as shown by the certificate of tonnage, have not been included in the gross measurements, or which were allowed as deductions for the accommodation of the crew after measurement, or which being within the engine, boiler, or bunker space, form no part of the net tonnage shown on the certificate.

And generally may verify whether all the spaces which ought to be included in the tonnage are entered on the certificate and are exactly determined thereon.

Sec. 3. Every vessel not provided with a special certificate or official papers giving the net tonnage laid down by the Constantinople Commission, shall be measured by the Company's agents in conformity with the Constantinople rules, and shall pay her dues according to such measurement, until she produces a special certificate from the authorities of her own country.

Sec. 4. Until further orders, ships in ballast will be allowed a reduction of 2 francs 50 centimes per ton on the tariff for transit.

Sec. 5. Any ship carrying mails or passengers, or having in her holds coals or other merchandise in whatever quantity, is not considered as being in ballast.

Sec. 6. The charge of ten francs per passenger above twelve years of age, or of five francs per passenger from 3 to 12 years old, as well as the transit dues, must be prepaid on entering the canal at Port Said or Port Thewfik.

Sec. 7. The berthing or anchorage dues at Port Said, Ismailia, and opposite the Company's embankment at Port Thewfik, are fixed at two centimes per day per ton after a stay of 24 hours at the berth assigned to the ship by the harbour-master and whatever be the duration of her stay. These dues will be collected every ten days.

Sec. 8. Claims for errors in the declaration of tonnage or in the levying of the dues must be sent in within a month after the ship's passage through

the canal. After this delay rectifications will not be admitted ; no erroneous application of the tariff can ever be brought forward as a precedent against the Company.

Art. 12.—Sec. 1. In the case of ships either towed or convoyed by the Company's tugs, no other division than that of one half of the length of the canal shall be allowed ; from Ismailia to Port Said being considered one half on one side, and from Ismailia to Port Thewfik the other half, on the other side.

The charges for towage in the canal by the Company's tug service are fixed as follows :—

For sailing vessels measuring 400 tons and under, 1,200 francs ; for sailing vessels measuring above 400 tons, 1,200 francs for the first 400 tons, and $2\frac{1}{2}$ francs for every surplus ton.

For steamers measuring above 400 tons, 2 francs per ton, without any distinction, upon their whole tonnage, but on the condition that they use their propelling power or keep it in readiness for assisting the tug.

Steamers measuring under 400 tons, also steamers not intending to give the assistance of their propelling power, will pay the same as sailing vessels.

For the towing of monitors, loaded or empty lighters, vessels not requiring the services of a first class tug, and all floating craft of any exceptional description, arrangements by contract to be made by private agreement.

It is hereby provided that when a tug shall only have accompanied or towed a vessel one half of the length of the canal, 600 francs shall be levied for the return trip of a first class, and 400 francs for a second class tug, and one half only of the total tonnage or tender dues shall be charged. All ships towed must furnish their own warps.

Sec. 2. The charges for towage in the roads by the Company's tug service to ships applying for tugs, are fixed at 25 centimes per ton of net tonnage at Port Said for the distance between the inner docks and the end of the jetties and conversely ; at Port Thewfik the distance between the docks and the roads and conversely, the minimum charge to be 50 francs.

For towage to a greater distance the amount shall be settled by private agreement.

Sec. 3. When a ship shall require a tug to act as a tender, the charge for such services will be 1,200 francs a day, if a tug of the first class be employed, and 800 francs a day for a tug of the second class. In the event of stoppage, the tug will render assistance in getting the vessel under way each time that it may be necessary. If the vessel is towed by the tender any distance exceeding that of one station from another, the charge for towage may be demanded in lieu of the tariff fixed for acting as a tender.

Sec. 4. In all other cases, tug hire will be invoiced according to tariff rates annexed to the present regulations.

Sec. 5. Shipowners are authorised to have their vessels towed and accompanied by their own steam tugs, all responsibility connected with such acts devolving upon themselves.

Such tugs are to be approved of by the Canal Company.

Ships towed or accompanied by tugs belonging to their own owners will pay 50 centimes per ton as towage dues.

Such tugs, whenever they shall tow or accompany vessels belonging to their own proper owners, will be free of any tax whatever.

Whenever they go through the canal for the purpose of meeting vessels of their owners which they are entitled to tow or accompany, or when returning to their usual berth after having towed or accompanied them through, the said tugs shall not be submitted to payment of the special navigation dues, but they must take a pilot on board.

Any transport of goods or passengers is prohibited to them; the fact of having on board passengers or goods would entail upon them the payment of all dues and charges to which ships in transit are subject.

Whenever the said tugs shall be used for towing or accompanying vessels not belonging to their own proper owners, the same dues and charges shall be levied on them as on ships in transit.

Besides the special treatment specified by the present article, tugs belonging to private owners shall be subject to the strict observance of the present regulations concerning vessels berthing or in transit.

Art. 13.—Pilotage charges for entering Port Said harbour and leaving the same are fixed as follows for ships not going through the canal :—

Pilotage by day-time	-	{ steamers	-	25 francs.
		{ sailing ships	-	10 „
Pilotage by night-time, before sunrise and after sunset	-	{ steamers	-	50 „
		{ sailing ships	-	20 „

The payment of the pilotage charge for entering Port Said harbour and leaving the same is compulsory on every ship measuring 100 tons gross and upwards.

Whatever length of time ships may stay in the harbour of Port Said, and whatever commercial operations they may transact there, total remission will be made of the pilotage charges for day-time entrance, or remission of half the charge for night-time entrance, if they decide to go through the canal.

The pilotage charge for entering or leaving Port Said harbour at night-time is fixed as follows for ships going through the canal.

Steamers	-	-	-	25 francs.
Sailing ships	-	-	-	10 „

Twenty francs per day is levied for a pilot kept on board in case of berthing.

Art. 14.—Provisionally and until further orders, ships, barges, lighters, and other craft, either coming in ballast or empty from Port Said under orders for Ismailia, or returning from Ismailia to Port Said with cargoes of native produce ; or bringing from Port Said to Ismailia cargoes bound to districts of Lower Egypt next to the canal, and returning empty or in ballast from Ismailia to Port Said, shall be exempted either outward or homeward bound whether they be empty or in ballast, from the special navigation dues and shall only be subject to the payment of 2 francs 60 centimes per ton, for their passage when loaded outward or homeward bound.

Such toll is to be prepaid when the said ships, barges, lighters or other craft, enter the canal, in ballast or empty, to go and take cargo of native produce at Ismailia as well as when loaded.

As regards dues or charges other than the special navigation dues, the said ships, barges, lighters or other craft, are bound to pay them in full.

Art. 15.—Charges of every description prescribed in these regulations must be paid in cash. Payments may be tendered either at the Company's cashier's offices in Egypt, or at the head office in Paris, or in the hands of any of the agents of the Company appointed to that effect.

In the case of any amounts tendered otherwise than at the Company's cashier's offices in the isthmus, *receipts* are delivered to shipowners or consignees which the captain may hand as cash to the Company's agents in Egypt appointed to collect the dues.

In case of payments not being effected in time to admit of *receipts* being sent to captains, the Company will inform by telegraph, their agents in Egypt, of the amounts so paid. The cost of telegrams to be defrayed by the shipowners.

Whenever amounts thus paid in advance shall be insufficient for the discharge in full of all charges and incidental expenses due by ships, the balance must be paid in Egypt at the Company's cashier's offices.

SIGNALS.—The following signals are in use in the canal :—

DAY SIGNALS by Station Masters (*i.e.*, at Gares, semaphore stations, &c.) black balls and cones being used :—

From Port Said towards Suez :—

- | | | | |
|-------------------------|---|---|------------------------|
| 1. One ball at masthead | - | - | signifies, Go ahead. |
| 2. Three balls | „ | - | „ Get into the siding. |
| 3. Three cones at peak | - | - | „ Slacken your speed. |

From Suez towards Port Said :—

- | | | | |
|--------------------------|---|---|------------------------------|
| 4. Two balls at masthead | - | - | „ Go ahead. |
| 5. Four balls | „ | - | „ { Get into the siding. |
| | | | { Anchor at the North Light. |
| 6. Four cones at peak | - | - | „ Slacken your speed. |

See plan, No. 233.

NIGHT SIGNALS:—

From Port Said towards Suez:—

1. Red light over white light at masthead - Go ahead.
2. Red light over two white lights „ - Get into the siding.
3. Red light over three white lights at peak - Slacken your speed.

From Suez towards Port Said:—

4. White light over red light at masthead - Go ahead.
5. Two white lights over red light „ - { Get into the siding.
Anchor at the North Light.
6. Three white lights over red light at peak - Slacken your speed.

The sidings at Kabret and kilometre 133 will signal passage clear to vessels being navigated at night with electric light, by hoisting at the same time the lanterns for night signal and the usual day signal.

Whenever the above-named sidings hoist the day signal "*slacken your speed*" together with the day signal "*passage clear*," the vessel which has navigated at night with electric light shall lessen her speed until ships in the siding, and proceeding in the same direction, shall have got under way.

TIDE SIGNALS:—

Day:—

7. One ball at peak - - - The current is running South.
8. When no signal is shown - - - „ „ nil.
9. Two balls at peak - - - „ „ North.

NIGHT:—

7. White light at peak - - - The current is running South.
8. „ over red light at peak - „ „ nil.
9. Red light at peak - - - „ „ North.

SIGNALS BETWEEN SHIPS UNDER WAY:—

- By Day {
10. Any pendant at masthead - I am aground.
 11. „ „ half-mast - I am moored. You can move on.
 12. Any flag at masthead - Slacken your speed.

Special Lights to be shown from Vessels at night:—

1. At night, a red light is to be shown at masthead if the vessel is slightly aground, and two red lights if, on the contrary, the ship is sufficiently hard aground to require tug assistance.

2. Vessels moored in the sidings are to exhibit four white lights, on the side where the channel is clear, viz.: One light at the stem; one light on the bulwarks, one-third the distance from the stem to the stern; one light on the bulwarks two-thirds the distance from the stem to the stern; and, one light at the stern.

3. All vessels made fast at night in the canal owing to any damage preventing their continuing under way, or finding themselves under

necessity to anchor in the Great Bitter lake outside of the South or North Light berths, must hoist a white light above two vertical red lights.

Note.—Signal No. 11 in the harbour of Port Said or in Suez roads, shows that the vessel with her pilot on board is not ready to get under way and misses her turn of departure.

SIGNALS FROM DREDGERS AND SEMAPHORE MASTS TO SHIPS UNDER WAY :—

13. A red flag by day or red light by night.—Passage not clear. A dredger or the appliances appertaining to it in the way.

When a dredger is at work in a curve and cannot be seen at a distance, a semaphore properly erected on the bank makes the same signal (red flag). These semaphores on the banks in the curves have a double purpose ; first, to inform the dredgers that vessels are getting near, in order that they may clear the way ; secondly, to inform the ships that a dredger or the appliances appertaining to it are in the way, and that they must stop until they have got into the siding.

SIGNALS FROM HOPPERS GOING OUT TO EMPTY, OR RETURNING :—

14. Pendant of any colour at half-mast.—The way is clear. You can move on.

Petroleum vessels.—In order that vessels laden with petroleum, in bulk, shall be readily distinguished, and avoided when passing through the Suez canal, they will show at the mizenmast the following distinguishing signals :—

By day - - A red flag above one ball.

By night - - A white light between two red lights.

When such vessels make any stay in port they will be isolated by means of floating booms.

DIRECTIONS.—The Suez canal has a depth of nearly 28 feet throughout its whole length, but the extreme draught of water of any ship using it must not exceed 25 feet 7 inches. The ship on arrival at either end of the canal must be entered at the Transit Office, and otherwise comply with the Canal Company's regulations, which permit steam-vessels to pass through the canal either under their own steam or to be towed, but towing is compulsory with sailing vessels above 50 tons.

All vessels are required to have head and stern anchors ready, also hawsers for warping ; and all vessels measuring over 100 tons are bound to take a pilot, who communicates all particulars concerning the passage through, but does not relieve the captain of the responsibility of safe steering.

The deepest water throughout is in the centre of the canal ; in passing through, it is therefore more a question of careful steerage to keep the ship exactly in the centre than of pilotage, and as it is probable that the

commander is better acquainted with the behaviour of his own vessel than the pilot who is a stranger, the commander is held responsible for the management of his ship. The closest attention is required in order to steer with a small helm.

The iron beacons on the several lakes are placed 136 feet on either side of the centre of the deep water in the channel. Over the greater part of the narrow reaches of the canal the channel is marked by floating beacons, placed abreast of the mooring bollards, at every cable's length. All beacons and buoys, as before described, are *black* tipped with *white* on the eastern side, and *red* on the western side of the deep water channel.

When two vessels proceeding in an opposite direction are in sight of each other, they must both decrease their speed and hug the starboard shore, or stop if so required by the pilot. Attention must also be paid to the signals to "Gare" which may be made from the various stations along the banks.

At every 5 or 6 miles a Gare or short widening of the canal gives room for a vessel to haul in and allow the passage of another vessel with ease. Small vessels can pass each other at any part by stopping and using warps, but they cannot do so under steam, except at great risk of running on shore and thus delaying the whole traffic of the canal.

Ships proceeding in the same direction may pass each other in the Great Bitter lake without asking permission, and may, if the canal is free from obstruction, re-enter the canal in the order in which they arrive; but should they have to stop from any cause before re-entering they are to proceed in the order in which they entered the Bitter lake from the canal.

In the pilotage of a steam-ship the principal point requiring attention is the speed, for if a vessel that under ordinary circumstances steers well is found to steer wildly on entering the canal, it is probable the right speed has not been discovered; and more than probable, on account of the natural desire to get rapidly through, that she is going too fast; the engines in this case should be eased until she steers better.

In passing from a wider into a narrower part of the canal, the same speed cannot be preserved at the same time with good steerage, and it becomes necessary to ease the engines.

As regards speed, it may be stated in short that each ship has her "canal temper," meaning thereby a speed suitable to the size of the vessel, at which she steers her best. It may not be out of place also to remark that, when in the canal, there is a certain speed attainable by each ship which she will not exceed, no matter how much the speed of the engines may be increased. This is owing to the large displacement of water as compared with the width and depth of the canal, and, it need scarcely be added, does not affect a vessel so much in the lakes.

the canal. After this delay rectifications will not be admitted ; no erroneous application of the tariff can ever be brought forward as a precedent against the Company.

Art. 12.—Sec. 1. In the case of ships either towed or convoyed by the Company's tugs, no other division than that of one half of the length of the canal shall be allowed ; from Ismailia to Port Said being considered one half on one side, and from Ismailia to Port Thewfik the other half, on the other side.

The charges for towage in the canal by the Company's tug service are fixed as follows :—

For sailing vessels measuring 400 tons and under, 1,200 francs ; for sailing vessels measuring above 400 tons, 1,200 francs for the first 400 tons, and $2\frac{1}{2}$ francs for every surplus ton.

For steamers measuring above 400 tons, 2 francs per ton, without any distinction, upon their whole tonnage, but on the condition that they use their propelling power or keep it in readiness for assisting the tug.

Steamers measuring under 400 tons, also steamers not intending to give the assistance of their propelling power, will pay the same as sailing vessels.

For the towing of monitors, loaded or empty lighters, vessels not requiring the services of a first class tug, and all floating craft of any exceptional description, arrangements by contract to be made by private agreement.

It is hereby provided that when a tug shall only have accompanied or towed a vessel one half of the length of the canal, 600 francs shall be levied for the return trip of a first class, and 400 francs for a second class tug, and one half only of the total tonnage or tender dues shall be charged. All ships towed must furnish their own warps.

Sec. 2. The charges for towage in the roads by the Company's tug service to ships applying for tugs, are fixed at 25 centimes per ton of net tonnage at Port Said for the distance between the inner docks and the end of the jetties and conversely ; at Port Thewfik the distance between the docks and the roads and conversely, the minimum charge to be 50 francs.

For towage to a greater distance the amount shall be settled by private agreement.

Sec. 3. When a ship shall require a tug to act as a tender, the charge for such services will be 1,200 francs a day, if a tug of the first class be employed, and 800 francs a day for a tug of the second class. In the event of stoppage, the tug will render assistance in getting the vessel under way each time that it may be necessary. If the vessel is towed by the tender any distance exceeding that of one station from another, the charge for towage may be demanded in lieu of the tariff fixed for acting as a tender.

Sec. 4. In all other cases, tug hire will be invoiced according to tariff rates annexed to the present regulations.

Sec. 5. Shipowners are authorised to have their vessels towed and accompanied by their own steam tugs, all responsibility connected with such acts devolving upon themselves.

Such tugs are to be approved of by the Canal Company.

Ships towed or accompanied by tugs belonging to their own owners will pay 50 centimes per ton as towage dues.

Such tugs, whenever they shall tow or accompany vessels belonging to their own proper owners, will be free of any tax whatever.

Whenever they go through the canal for the purpose of meeting vessels of their owners which they are entitled to tow or accompany, or when returning to their usual berth after having towed or accompanied them through, the said tugs shall not be submitted to payment of the special navigation dues, but they must take a pilot on board.

Any transport of goods or passengers is prohibited to them; the fact of having on board passengers or goods would entail upon them the payment of all dues and charges to which ships in transit are subject.

Whenever the said tugs shall be used for towing or accompanying vessels not belonging to their own proper owners, the same dues and charges shall be levied on them as on ships in transit.

Besides the special treatment specified by the present article, tugs belonging to private owners shall be subject to the strict observance of the present regulations concerning vessels berthing or in transit.

Art. 13.—Pilotage charges for entering Port Said harbour and leaving the same are fixed as follows for ships not going through the canal :—

Pilotage by day-time	-	{ steamers	-	25 francs.
		{ sailing ships	-	10 „
Pilotage by night-time, before sunrise and after sunset	-	{ steamers	-	50 „
		{ sailing ships	-	20 „

The payment of the pilotage charge for entering Port Said harbour and leaving the same is compulsory on every ship measuring 100 tons gross and upwards.

Whatever length of time ships may stay in the harbour of Port Said, and whatever commercial operations they may transact there, total remission will be made of the pilotage charges for day-time entrance, or remission of half the charge for night-time entrance, if they decide to go through the canal.

The pilotage charge for entering or leaving Port Said harbour at night-time is fixed as follows for ships going through the canal.

Steamers	-	-	-	25 francs.
Sailing ships	-	-	-	10 „

Twenty francs per day is levied for a pilot kept on board in case of berthing.

Art. 14.—Provisionally and until further orders, ships, barges, lighters, and other craft, either coming in ballast or empty from Port Said under orders for Ismailia, or returning from Ismailia to Port Said with cargoes of native produce ; or bringing from Port Said to Ismailia cargoes bound to districts of Lower Egypt next to the canal, and returning empty or in ballast from Ismailia to Port Said, shall be exempted either outward or homeward bound whether they be empty or in ballast, from the special navigation dues and shall only be subject to the payment of 2 francs 60 centimes per ton, for their passage when loaded outward or homeward bound.

Such toll is to be prepaid when the said ships, barges, lighters or other craft, enter the canal, in ballast or empty, to go and take cargo of native produce at Ismailia as well as when loaded.

As regards dues or charges other than the special navigation dues, the said ships, barges, lighters or other craft, are bound to pay them in full.

Art. 15.—Charges of every description prescribed in these regulations must be paid in cash. Payments may be tendered either at the Company's cashier's offices in Egypt, or at the head office in Paris, or in the hands of any of the agents of the Company appointed to that effect.

In the case of any amounts tendered otherwise than at the Company's cashier's offices in the isthmus, *receipts* are delivered to shipowners or consignees which the captain may hand as cash to the Company's agents in Egypt appointed to collect the dues.

In case of payments not being effected in time to admit of *receipts* being sent to captains, the Company will inform by telegraph, their agents in Egypt, of the amounts so paid. The cost of telegrams to be defrayed by the shipowners.

Whenever amounts thus paid in advance shall be insufficient for the discharge in full of all charges and incidental expenses due by ships, the balance must be paid in Egypt at the Company's cashier's offices.

SIGNALS.—The following signals are in use in the canal :—

DAY SIGNALS by Station Masters (*i.e.*, at Gares, semaphore stations, &c.) black balls and cones being used :—

From Port Said towards Suez :—

- | | | | |
|-------------------------|---|---|------------------------|
| 1. One ball at masthead | - | - | signifies, Go ahead. |
| 2. Three balls | „ | - | „ Get into the siding. |
| 3. Three cones at peak | - | - | „ Slacken your speed. |

From Suez towards Port Said :—

- | | | | |
|--------------------------|---|---|------------------------------|
| 4. Two balls at masthead | - | - | „ Go ahead. |
| 5. Four balls | „ | - | „ { Get into the siding. |
| | | | { Anchor at the North Light. |
| 6. Four cones at peak | - | - | „ Slacken your speed. |

See plan, No. 233.

NIGHT SIGNALS:—

From Port Said towards Suez:—

1. Red light over white light at masthead - Go ahead.
2. Red light over two white lights „ - Get into the siding.
3. Red light over three white lights at peak - Slacken your speed.

From Suez towards Port Said:—

4. White light over red light at masthead - Go ahead.
5. Two white lights over red light „ - { Get into the siding.
Anchor at the North Light.
6. Three white lights over red light at peak - Slacken your speed.

The sidings at Kabret and kilometre 133 will signal passage clear to vessels being navigated at night with electric light, by hoisting at the same time the lanterns for night signal and the usual day signal.

Whenever the above-named sidings hoist the day signal “*slacken your speed*” together with the day signal “*passage clear*,” the vessel which has navigated at night with electric light shall lessen her speed until ships in the siding, and proceeding in the same direction, shall have got under way.

TIDE SIGNALS:—

Day:—

7. One ball at peak - - - The current is running South.
8. When no signal is shown - - - „ „ nil.
9. Two balls at peak - - - „ „ North.

NIGHT:—

7. White light at peak - - - The current is running South.
8. „ over red light at peak - „ „ nil.
9. Red light at peak - - - „ „ North.

SIGNALS BETWEEN SHIPS UNDER WAY:—

- By Day** {
10. Any pendant at masthead - I am aground.
 11. „ „ half-mast - I am moored. You can move on.
 12. Any flag at masthead - Slacken your speed.

Special Lights to be shown from Vessels at night:—

1. At night, a red light is to be shown at masthead if the vessel is slightly aground, and two red lights if, on the contrary, the ship is sufficiently hard aground to require tug assistance.

2. Vessels moored in the sidings are to exhibit four white lights, on the side where the channel is clear, viz.: One light at the stem; one light on the bulwarks, one-third the distance from the stem to the stern; one light on the bulwarks two-thirds the distance from the stem to the stern; and, one light at the stern.

3. All vessels made fast at night in the canal owing to any damage preventing their continuing under way, or finding themselves under

necessity to anchor in the Great Bitter lake outside of the South or North Light berths, must hoist a white light above two vertical red lights.

Note.—Signal No. 11 in the harbour of Port Said or in Suez roads, shows that the vessel with her pilot on board is not ready to get under way and misses her turn of departure.

SIGNALS FROM DREDGERS AND SEMAPHORE MASTS TO SHIPS UNDER WAY :—

13. A red flag by day or red light by night.—Passage not clear. A dredger or the appliances appertaining to it in the way.

When a dredger is at work in a curve and cannot be seen at a distance, a semaphore properly erected on the bank makes the same signal (red flag). These semaphores on the banks in the curves have a double purpose ; first, to inform the dredgers that vessels are getting near, in order that they may clear the way ; secondly, to inform the ships that a dredger or the appliances appertaining to it are in the way, and that they must stop until they have got into the siding.

SIGNALS FROM HOPPERS GOING OUT TO EMPTY, OR RETURNING :—

14. Pendant of any colour at half-mast.—The way is clear. You can move on.

Petroleum vessels.—In order that vessels laden with petroleum, in bulk, shall be readily distinguished, and avoided when passing through the Suez canal, they will show at the mizenmast the following distinguishing signals :—

By day - - A red flag above one ball.

By night - - A white light between two red lights.

When such vessels make any stay in port they will be isolated by means of floating booms.

DIRECTIONS.—The Suez canal has a depth of nearly 28 feet throughout its whole length, but the extreme draught of water of any ship using it must not exceed 25 feet 7 inches. The ship on arrival at either end of the canal must be entered at the Transit Office, and otherwise comply with the Canal Company's regulations, which permit steam-vessels to pass through the canal either under their own steam or to be towed, but towing is compulsory with sailing vessels above 50 tons.

All vessels are required to have head and stern anchors ready, also hawsers for warping ; and all vessels measuring over 100 tons are bound to take a pilot, who communicates all particulars concerning passage through, but does not relieve the captain of steering.

The deepest water throughout is in the middle of the canal. Through, it is therefore more a question of steering a ship exactly in the centre than of

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commander is better acquainted with the behaviour of his own vessel than the pilot who is a stranger, the commander is held responsible for the management of his ship. The closest attention is required in order to steer with a small helm.

The iron beacons on the several lakes are placed 136 feet on either side of the centre of the deep water in the channel. Over the greater part of the narrow reaches of the canal the channel is marked by floating beacons, placed abreast of the mooring bollards, at every cable's length. All beacons and buoys, as before described, are *black* tipped with *white* on the eastern side, and *red* on the western side of the deep water channel.

When two vessels proceeding in an opposite direction are in sight of each other, they must both decrease their speed and hug the starboard shore, or stop if so required by the pilot. Attention must also be paid to the signals to "Gare" which may be made from the various stations along the banks.

At every 5 or 6 miles a Gare or short widening of the canal gives room for a vessel to haul in and allow the passage of another vessel with ease. Small vessels can pass each other at any part by stopping and using *warps*, but they cannot do so under steam, except at great risk of running on shore and thus delaying the whole traffic of the canal.

Ships proceeding in the same direction may pass each other in the Great Bitter lake without asking permission, and may, if the canal is free from obstruction, re-enter the canal in the order in which they entered, but should they have to stop from any cause before re-entering they are to proceed in the order in which they entered the Red Sea from the canal.

In the pilotage of a steam-ship the principal point requiring attention is the speed, for if a vessel that under ordinary circumstances steers well is found to steer wildly on entering the canal, it is probable the right speed has not been discovered; and more than probable, on account of the natural desire to get rapidly through, that she is going too fast. The engines in this case should be eased until she steers better.

In passing from a wider into a narrower part of the canal, the same speed cannot be preserved at the same time with good steering, and it becomes necessary to ease the engines.

Every ship has her "canal size" of the vessel, at which she can pass with ease. It is also to remark that, the larger the vessel, the more by each ship which is required to be eased. If the engines may be eased without as much as is required for a smaller vessel, it is better to ease them a little more than to ease them too much.

In passing round a curve in the canal, in very long ships, the greatest caution must be exercised, and there should be a tug towing ahead. The engines should be stopped or moved as slowly as possible, that she may pass it at the slowest speed. This operation requires the utmost attention, especially in a vessel fitted with twin propellers, as regards the proximity of the propellers to the banks.

In passing the canal dredgers hauled into the banks and also vessels in the sidings, great caution is required. The speed should be very slow, as the reaction of the ship's wave, even if she is going at a moderate rate, is liable to make the stationary vessels snap their fastenings, and then fall foul of the ship under way.

All vessels should be steered from the bridge, the captain and the pilot, if possible, being alongside the helmsmen. The latter should be selected men.

The only serious damage vessels are liable to sustain in passing through the canal is from the propeller coming in contact with the bank; when the wind blows across the canal, care must be taken to prevent the ship drifting to leeward, and all possible upper gear should be sent down. It is better to stop and secure to the bollards than to risk damaging the propeller by using it near the lee bank. In stopping the engines, when fitted with a two-bladed propeller, a necessary precaution suggests itself, viz., to place the screw upright, not only on account of possible obstructions, but also from the well-known fact that a ship steers better with it in that position. With a beam wind, great care is required in getting under way from the Gares to prevent drifting on the lee bank. Hawsers fitted with spliced eyes are the most convenient for canal work.

The most difficult part of the canal passage, leaving the effect of a strong wind out of consideration, is between Suez and the Little Bitter lake, on account of the rapid tides that prevail in that space; and it has been recommended with good reason that this portion should be navigated either during the slack or against an opposing tide. Ships have frequently grounded in this locality, probably from disregard of this precaution.

Medical inspection.—No vessel is allowed to enter the canal from the southward without a medical inspection by the sanitary authorities at Suez. It is, therefore, necessary for all ships from the southward to anchor.

Homeward-bound passenger vessels are free to transit the canal in quarantine without communication with the shore; and most of the larger mail steamers have begun to do so. (*See* page 47.)

Anchoring.—Between Port Said and Port Thewfik, vessels can anchor only in lake Timsah, and in the Great Bitter lake. No ship is allowed to anchor in the canal except from unavoidable circumstances, and then only with the consent of the pilot.

When a ship is obliged to stop, a siding should, if possible, be reached. When one is not at hand, the vessel must be made fast head and stern to the weather bank. In either case, a vessel should show four white lights on the side where the channel is clear, viz.:—One light at the stem; one light on the bulwarks, one-third the distance from the stem to the stern; one light on the bulwarks, two-thirds the distance from the stem to the stern; and one light at the stern. The usual look-out must be kept.

Having in the preceding pages of this chapter described the Suez canal, with full directions for its passage, a description of the shoals and islands lying in or near the usual track of full powered steam vessels through the Red sea as described in Chapter I. is now given, deferring the description of the town and bay of Suez, with its port, Ibrahim, and the coasts and shoals of the gulf of Suez, to Chapter III., where they will be found commencing at page 84; it may, however, be here stated that the only shoals in the gulf of Suez which can be properly called central are the Sheratib which extend from the eastern shore off to the centre, and the Moresby shoal of 3 fathoms which is absolutely central.

The central islands and shoals of the Red sea are as follows:—The Brothers islets, Dædalus reef, Jebel Teir island, Zebayir islands, Avocet rock, Jebel Zukur and Abu Ail islands, Hanish islands, Haycocks, and Mohabbakah islands. With the exception of the first two, they all lie in the southern part of the sea.

THE BROTHERS are two small coral islets, bearing from each other N.W. $\frac{3}{4}$ W. and S.E. $\frac{3}{4}$ E., with a passage between them one mile wide. The northern islet, 33 feet high, is 3 cables long, and less than a cable wide. The lighthouse, presently described, stands near its centre; on the south-western side of the islet an iron jetty, 180 feet long, extends to the edge of the reef. The southern islet, 20 feet high, is one cable long, and about half a cable wide. The depths around both and between them are from 100 to 250 fathoms, and there are no indications of shoal water or of off-lying danger in any direction. They are steep-to, the fringe of coral extending only a few yards from high-water mark, with the exception of a small projection from the north-western end of the smaller islet, where there are 3 fathoms at a short distance from the point.

LIGHT.—From a circular white stone lighthouse, in lat. $26^{\circ} 19' N.$, long. $34^{\circ} 51' E.$, on the northern islet of the Brothers, is shown a *fixed white* light, at an elevation of 71 feet above the sea, visible in clear weather at the distance of 12 miles.

From Shadwân lighthouse, the Brothers lighthouse bears S.S.E. $\frac{1}{2}$ E. about 80 miles. Before the establishment of the light, these islets might

See chart, No. 8a; and plan, on No. 8b.

day a blue signal with the letter P cut out in blank in the centre, and by night a *white* light.

Art. 7.—All ships ready to enter the canal must have their yards braced forward, their jib-booms run in and their boats swinging inboard. In addition to their two bow anchors, they must carry at the stern ready for letting go at the request of the pilot, a strong kedje with a stout hawser bent on, sufficient to hold the ship.

Art. 8.—Sec. 1. Every ship must, during her passage through the canal, have either in tow or ready to lower, a boat fully equipped carrying a hawser in readiness to be run out at once and made fast to one of the mooring posts on either side of the canal.

Sec. 2. The captain must set a watch both by day and night; the men to be in readiness to ease away or cut hawsers as may be required.

All ships whether made fast in a siding, or moored at any point, or aground in the canal, shall ease their hawsers in order to give free passage to tugs, steam launches, hopper-barges, and any other craft of a light draught, that may have to pass them.

Sec. 3. All steamers, tugs included, must blow their whistles when approaching the curves of the canal, also when approaching in either direction boats or lighters, dredgers, or any craft afloat. They must stop when the channel is not clear, and pass at a reduced speed all sidings, stone or earth-work yards; they must also slacken speed and have their two bow anchors ready for letting go when passing vessels made fast or under way, hopper-barges, dredgers, or any other craft.

Sec. 4. Whenever a collision appears probable, no ship must hesitate to run aground and thus avoid the collision. The expenses consequent upon grounding under these circumstances shall be defrayed by the ship in fault.

Sec. 5. Ships proceeding in the same direction are not allowed to pass each other under way in the canal.

In the case of a ship being allowed to pass another one ahead of her, she must conform with the Company's directions to that effect.

Sec. 6. Navigation of sailing craft of every description at night is entirely forbidden.

Sec. 7. Steamers intending to go through the canal at night must first satisfy the agents of the Company in Port Said, or Port Thewfik, that they are provided :—

(1.) With an electric search-light or search-lights showing the channel 1,200 metres (1,312 yards) ahead, and so constructed as to admit of rapid splitting up of the beam of rays into two separate segments with a dark sector in the middle.

(2.) With electric lights powerful enough to light up a circular area of about 200 metres (219 yards) diameter, around the ship.

The agents of the Company will decide whether the apparatus fulfil the requirements of the regulations, so that ships provided with them may, without inconvenience, be authorised to navigate the canal at night.

Night transit may, however, be suspended in case of failure or want of power in the lights.*

Sec. 8. While navigating by night, ships must carry their usual lights and have a man on the look-out forward.

Whenever a vessel navigating by night has made fast, whether in a siding or in the canal, she must, thereupon, at once extinguish her search-light or search-lights, and lights above stated, as well as her course lights, and show four white lights on the side where the channel is clear, one light at the stem, one light on the bulwarks one-third the distance from the stem to the stern, another light on the bulwarks two-thirds the distance from the stem to the stern, and the fourth light at the stern.

All ships navigating at night in the Large Bitter lake between the North and South lights must extinguish their search-light or search-lights.

Any ship coming into Port Said at night from the south must extinguish her search-light or search-lights when making the curve from the canal into the harbour.

Sec. 9. Whenever a ship navigating at night is accidentally stopped on her way, her white light astern must at once be replaced by a red light. In case other vessels are following her she must, at the same time, sound her steam-whistle four or five times in quick succession, repeating this at a few moments' interval until the ship following her repeats this signal, which shall be taken as an order to slacken speed at once with a view to stopping, if need be.

Sec. 10. Whenever a ship makes fast, enters a siding, or gets aground, the captain must give immediate notice thereof by means of the signals specified in the appendix to these regulations. (See p. 67.)

Sec. 11. Navigation at night by steamers unprovided with electric light is only authorised under exceptional circumstances, the captain accepting entire responsibility in writing for any delay, mishap, and damages that may happen to his own ship, as well as for any similar accidents he may cause to other ships in transit, or to the Company's craft and plant happening to be in the canal. Ships navigating under these conditions remain subject to all other rules regarding night transit.

Art. 9. In the event of grounding, the agents of the Company alone shall have the right to direct all operations by which a vessel is to be floated off again, to unload and tow the vessel as may be necessary, by means of the plant and stock which the Company has at hand, at the

* Electric light apparatus can be hired at either end of the canal, see p. 53.

See plan, No. 233.

expense of the vessel, unless it be regularly proved that there was an insufficient depth of water in the canal, or that erroneous direction by the pilot had caused the grounding.

The aforesaid costs of floating, towing, discharging, and re-loading, &c., must be paid conformably with a statement or estimate drawn up by the Company, before the departure of the ship from Port Said or Port Thewfik.*

All manœuvres with the object of helping grounded vessels to get off are formally prohibited to other ships in transit.

Art. 10.—The following acts are prohibited :—

1. The overloading of the deck, before entering the canal, with coals or other merchandise which might alter the general stability of the vessels or would interfere with navigation.

2. The anchoring of a ship in the canal, except through unavoidable circumstances, and then only with the consent of the pilot.

3. Throwing overboard in the ports; and during the journey from sea to sea, and at any point whatever of such journey, earth, ashes, cinders, or material of any kind.

4. Picking up, without the direct intervention of the Company's agents, anything that may have fallen into the canal.

Should any material of whatever kind fall overboard, the circumstances are to be immediately made known to the pilot, who is instructed to transmit such information to the Company's agent at the nearest station.

The recovery of all articles dropped into the canal, in whatever way such salvage is effected, shall be carried out at the expense of the captain, to whom such articles will be restored on reimbursement of the said expense.

5. It is expressly forbidden, and on penalty of legal proceedings, to masters of ships while in the canal or in the ports or sidings thereunto appertaining, to allow any guns to be fired from on board their ships.

* From the 1st of October, 1883, and until further orders, whenever a ship going through the canal happens, except in the roads and ports, to ground or stop in consequence of an accident independent of collision, the Company, in order to remove the obstruction in the fairway with all possible speed, and to hasten the restarting of the grounded or stopped ship, will not claim from the captains, the consignees, or the shipowners, the reimbursement of the expenses incurred in refloating the ship, and, if deemed necessary, for towing her as far as the next siding. If from such siding the ship continues her journey in tow, she must pay towage charges according to rates annexed to the present regulations.

It is moreover well understood that ships will have to bear all expenses incurred for the necessary repairs or putting into condition with a view to remedy such damages as might interfere with their restarting, whatever be the time at which these damages may have occurred, and that the said ships will remain responsible for the damages which may be the consequence of their grounding.

The Company will continue to perform the work of refloating the grounded ships under the supervision of their officers exclusively, and will use first the means available on board, and afterwards or simultaneously the machinery or appliances belonging to the Company.

See plan, No. 233.

6. They are forbidden to sound their steam-whistle in the ports of the canal, except as an alarm signal in case of serious danger.

7. Burial in the banks of the canal is forbidden.

Art. II.—Sec. 1. The net tonnage resulting from the system of measurement laid down by the International Commission of Constantinople, and inscribed on the special certificates issued by the competent authorities, or on the ship's official papers, is the basis for levying the special navigation due, which is at present nine francs.

In levying the dues, any alteration of net tonnage subsequent to the delivery of the above-mentioned certificate or papers, shall be taken into account.

Sec. 2. The canal authorities may ascertain whether cargo or passengers are carried in any spaces which, as shown by the certificate of tonnage, have not been included in the gross measurements, or which were allowed as deductions for the accommodation of the crew after measurement, or which being within the engine, boiler, or bunker space, form no part of the net tonnage shown on the certificate.

And generally may verify whether all the spaces which ought to be included in the tonnage are entered on the certificate and are exactly determined thereon.

Sec. 3. Every vessel not provided with a special certificate or official papers giving the net tonnage laid down by the Constantinople Commission, shall be measured by the Company's agents in conformity with the Constantinople rules, and shall pay her dues according to such measurement, until she produces a special certificate from the authorities of her own country.

Sec. 4. Until further orders, ships in ballast will be allowed a reduction of 2 francs 50 centimes per ton on the tariff for transit.

Sec. 5. Any ship carrying mails or passengers, or having in her holds coals or other merchandise in whatever quantity, is not considered as being in ballast.

Sec. 6. The charge of ten francs per passenger above twelve years of age, or of five francs per passenger from 3 to 12 years old, as well as the transit dues, must be prepaid on entering the canal at Port Said or Port Thewfik.

Sec. 7. The berthing or anchorage dues at Port Said, Ismailia, and opposite the Company's embankment at Port Thewfik, are fixed at two centimes per day per ton after a stay of 24 hours at the berth assigned to the ship by the harbour-master and whatever be the duration of her stay. These dues will be collected every ten days.

Sec. 8. Claims for errors in the declaration of tonnage or in the levying of the dues must be sent in within a month after the ship's passage through

the canal. After this delay rectifications will not be admitted ; no erroneous application of the tariff can ever be brought forward as a precedent against the Company.

Art. 12.—Sec. 1. In the case of ships either towed or convoyed by the Company's tugs, no other division than that of one half of the length of the canal shall be allowed ; from Ismailia to Port Said being considered one half on one side, and from Ismailia to Port Thewfik the other half, on the other side.

The charges for towage in the canal by the Company's tug service are fixed as follows :—

For sailing vessels measuring 400 tons and under, 1,200 francs ; for sailing vessels measuring above 400 tons, 1,200 francs for the first 400 tons, and 2½ francs for every surplus ton.

For steamers measuring above 400 tons, 2 francs per ton, without any distinction, upon their whole tonnage, but on the condition that they use their propelling power or keep it in readiness for assisting the tug.

Steamers measuring under 400 tons, also steamers not intending to give the assistance of their propelling power, will pay the same as sailing vessels.

For the towing of monitors, loaded or empty lighters, vessels not requiring the services of a first class tug, and all floating craft of any exceptional description, arrangements by contract to be made by private agreement.

It is hereby provided that when a tug shall only have accompanied or towed a vessel one half of the length of the canal, 600 francs shall be levied for the return trip of a first class, and 400 francs for a second class tug, and one half only of the total tonnage or tender dues shall be charged. All ships towed must furnish their own warps.

Sec. 2. The charges for towage in the roads by the Company's tug service to ships applying for tugs, are fixed at 25 centimes per ton of net tonnage at Port Said for the distance between the inner docks and the end of the jetties and conversely ; at Port Thewfik the distance between the docks and the roads and conversely, the minimum charge to be 50 francs.

For towage to a greater distance the amount shall be settled by private agreement.

Sec. 3. When a ship shall require a tug to act as a tender, the charge for such services will be 1,200 francs a day, if a tug of the first class be employed, and 800 francs a day for a tug of the second class. In the event of stoppage, the tug will render assistance in getting the vessel under way each time that it may be necessary. If the vessel is towed by the tender any distance exceeding that of one station from another, the charge for towage may be demanded in lieu of the tariff fixed for acting as a tender.

Sec. 4. In all other cases, tug hire will be invoiced according to tariff rates annexed to the present regulations.

Sec. 5. Shipowners are authorised to have their vessels towed and accompanied by their own steam tugs, all responsibility connected with such acts devolving upon themselves.

Such tugs are to be approved of by the Canal Company.

Ships towed or accompanied by tugs belonging to their own owners will pay 50 centimes per ton as towage dues.

Such tugs, whenever they shall tow or accompany vessels belonging to their own proper owners, will be free of any tax whatever.

Whenever they go through the canal for the purpose of meeting vessels of their owners which they are entitled to tow or accompany, or when returning to their usual berth after having towed or accompanied them through, the said tugs shall not be submitted to payment of the special navigation dues, but they must take a pilot on board.

Any transport of goods or passengers is prohibited to them; the fact of having on board passengers or goods would entail upon them the payment of all dues and charges to which ships in transit are subject.

Whenever the said tugs shall be used for towing or accompanying vessels not belonging to their own proper owners, the same dues and charges shall be levied on them as on ships in transit.

Besides the special treatment specified by the present article, tugs belonging to private owners shall be subject to the strict observance of the present regulations concerning vessels berthing or in transit.

Art. 13.—Pilotage charges for entering Port Said harbour and leaving the same are fixed as follows for ships not going through the canal :—

Pilotage by day-time -	{	steamers -	25 francs.
		sailing ships -	10 „
Pilotage by night-time, before sunrise and after sunset -	{	steamers -	50 „
		sailing ships -	20 „

The payment of the pilotage charge for entering Port Said harbour and leaving the same is compulsory on every ship measuring 100 tons gross and upwards.

Whatever length of time ships may stay in the harbour of Port Said, and whatever commercial operations they may transact there, total remission will be made of the pilotage charges for day-time entrance, or remission of half the charge for night-time entrance, if they decide to go through the canal.

The pilotage charge for entering or leaving Port Said harbour at night-time is fixed as follows for ships going through the canal.

Steamers -	-	-	25 francs.
Sailing ships -	-	-	10 „

Twenty francs per day is levied for a pilot kept on board in case of berthing.

Art. 14.—Provisionally and until further orders, ships, barges, lighters, and other craft, either coming in ballast or empty from Port Said under orders for Ismailia, or returning from Ismailia to Port Said with cargoes of native produce ; or bringing from Port Said to Ismailia cargoes bound to districts of Lower Egypt next to the canal, and returning empty or in ballast from Ismailia to Port Said, shall be exempted either outward or homeward bound whether they be empty or in ballast, from the special navigation dues and shall only be subject to the payment of 2 francs 60 centimes per ton, for their passage when loaded outward or homeward bound.

Such toll is to be prepaid when the said ships, barges, lighters or other craft, enter the canal, in ballast or empty, to go and take cargo of native produce at Ismailia as well as when loaded.

As regards dues or charges other than the special navigation dues, the said ships, barges, lighters or other craft, are bound to pay them in full.

Art. 15.—Charges of every description prescribed in these regulations must be paid in cash. Payments may be tendered either at the Company's cashier's offices in Egypt, or at the head office in Paris, or in the hands of any of the agents of the Company appointed to that effect.

In the case of any amounts tendered otherwise than at the Company's cashier's offices in the isthmus, *receipts* are delivered to shipowners or consignees which the captain may hand as cash to the Company's agents in Egypt appointed to collect the dues.

In case of payments not being effected in time to admit of *receipts* being sent to captains, the Company will inform by telegraph, their agents in Egypt, of the amounts so paid. The cost of telegrams to be defrayed by the shipowners.

Whenever amounts thus paid in advance shall be insufficient for the discharge in full of all charges and incidental expenses due by ships, the balance must be paid in Egypt at the Company's cashier's offices.

SIGNALS.—The following signals are in use in the canal :—

DAY SIGNALS by Station Masters (*i.e.*, at Gares, semaphore stations, &c.) black balls and cones being used :—

From Port Said towards Suez :—

- | | | | |
|-------------------------|---|---|------------------------|
| 1. One ball at masthead | - | - | signifies, Go ahead. |
| 2. Three balls | „ | - | „ Get into the siding. |
| 3. Three cones at peak | - | - | „ Slacken your speed. |

From Suez towards Port Said :—

- | | | | |
|--------------------------|---|---|------------------------------|
| 4. Two balls at masthead | - | - | „ Go ahead. |
| 5. Four balls | „ | - | „ { Get into the siding. |
| | | | { Anchor at the North Light. |
| 6. Four cones at peak | - | - | „ Slacken your speed. |

See plan, No. 233.

NIGHT SIGNALS:—

From Port Said towards Suez:—

1. Red light over white light at masthead - Go ahead.
2. Red light over two white lights „ - Get into the siding.
3. Red light over three white lights at peak - Slacken your speed.

From Suez towards Port Said:—

4. White light over red light at masthead - Go ahead.
5. Two white lights over red light „ - { Get into the siding.
Anchor at the North Light.
6. Three white lights over red light at peak - Slacken your speed.

The sidings at Kabret and kilometre 133 will signal passage clear to vessels being navigated at night with electric light, by hoisting at the same time the lanterns for night signal and the usual day signal.

Whenever the above-named sidings hoist the day signal “*slacken your speed*” together with the day signal “*passage clear*,” the vessel which has navigated at night with electric light shall lessen her speed until ships in the siding, and proceeding in the same direction, shall have got under way.

TIDE SIGNALS:—

Day:—

7. One ball at peak - - - The current is running South.
8. When no signal is shown - - - „ „ nil.
9. Two balls at peak - - - „ „ North.

NIGHT:—

7. White light at peak - - - The current is running South.
8. „ over red light at peak - „ „ nil.
9. Red light at peak - - - „ „ North.

SIGNALS BETWEEN SHIPS UNDER WAY:—

- | | |
|-------------|---|
| By
Day { | 10. Any pendant at masthead - I am aground. |
| | 11. „ „ half-mast - I am moored. You can move on. |
| | 12. Any flag at masthead - Slacken your speed. |

Special Lights to be shown from Vessels at night:—

1. At night, a red light is to be shown at masthead if the vessel is slightly aground, and two red lights if, on the contrary, the ship is sufficiently hard aground to require tug assistance.

2. Vessels moored in the sidings are to exhibit four white lights, on the side where the channel is clear, viz. : One light at the stem ; one light on the bulwarks, one-third the distance from the stem to the stern ; one light on the bulwarks two-thirds the distance from the stem to the stern ; and, one light at the stern.

3. All vessels made fast at night in the canal owing to any damage preventing their continuing under way, or finding themselves under

necessity to anchor in the Great Bitter lake outside of the South or North Light berths, must hoist a white light above two vertical red lights.

Note.—Signal No. 11 in the harbour of Port Said or in Suez roads, shows that the vessel with her pilot on board is not ready to get under way and misses her turn of departure.

SIGNALS FROM DREDGERS AND SEMAPHORE MASTS TO SHIPS UNDER WAY :—

13. A red flag by day or red light by night.—Passage not clear. A dredger or the appliances appertaining to it in the way.

When a dredger is at work in a curve and cannot be seen at a distance, a semaphore properly erected on the bank makes the same signal (red flag). These semaphores on the banks in the curves have a double purpose ; first, to inform the dredgers that vessels are getting near, in order that they may clear the way ; secondly, to inform the ships that a dredger or the appliances appertaining to it are in the way, and that they must stop until they have got into the siding.

SIGNALS FROM HOPPERS GOING OUT TO EMPTY, OR RETURNING :—

14. Pendant of any colour at half-mast.—The way is clear. You can move on.

Petroleum vessels.—In order that vessels laden with petroleum, in bulk, shall be readily distinguished, and avoided when passing through the Suez canal, they will show at the mizenmast the following distinguishing signals :—

By day - - A red flag above one ball.

By night - - A white light between two red lights.

When such vessels make any stay in port they will be isolated by means of floating booms.

DIRECTIONS.—The Suez canal has a depth of nearly 23 feet throughout its whole length, but the extreme draught of water of any ship using it must not exceed 25 feet 7 inches. The ship on arrival at either end of the canal must be entered at the Transit Office, and otherwise comply with the Canal Company's regulations, which permit steam-vessels to pass through the canal either under their own steam or to be towed, but towing is compulsory with sailing vessels above 50 tons.

All vessels are required to have head and stern anchors ready, also hawsers for warping ; and all vessels measuring over 100 tons are bound to take a pilot, who communicates all particulars concerning the passage through, but does not relieve the captain of the responsibility of safe steering.

The deepest water throughout is in the centre of the canal ; in passing through, it is therefore more a question of careful steerage to keep the ship exactly in the centre than of pilotage, and as it is probable that the

commander is better acquainted with the behaviour of his own vessel than the pilot who is a stranger, the commander is held responsible for the management of his ship. The closest attention is required in order to steer with a small helm.

The iron beacons on the several lakes are placed 136 feet on either side of the centre of the deep water in the channel. Over the greater part of the narrow reaches of the canal the channel is marked by floating beacons, placed abreast of the mooring bollards, at every cable's length. All beacons and buoys, as before described, are *black* tipped with *white* on the eastern side, and *red* on the western side of the deep water channel.

When two vessels proceeding in an opposite direction are in sight of each other, they must both decrease their speed and hug the starboard shore, or stop if so required by the pilot. Attention must also be paid to the signals to "Gare" which may be made from the various stations along the banks.

At every 5 or 6 miles a Gare or short widening of the canal gives room for a vessel to haul in and allow the passage of another vessel with ease. Small vessels can pass each other at any part by stopping and using warps, but they cannot do so under steam, except at great risk of running on shore and thus delaying the whole traffic of the canal.

Ships proceeding in the same direction may pass each other in the Great Bitter lake without asking permission, and may, if the canal is free from obstruction, re-enter the canal in the order in which they arrive; but should they have to stop from any cause before re-entering they are to proceed in the order in which they entered the Bitter lake from the canal.

In the pilotage of a steam-ship the principal point requiring attention is the speed, for if a vessel that under ordinary circumstances steers well is found to steer wildly on entering the canal, it is probable the right speed has not been discovered; and more than probable, on account of the natural desire to get rapidly through, that she is going too fast; the engines in this case should be eased until she steers better.

In passing from a wider into a narrower part of the canal, the same speed cannot be preserved at the same time with good steerage, and it becomes necessary to ease the engines.

As regards speed, it may be stated in short that each ship has her "canal temper," meaning thereby a speed suitable to the size of the vessel, at which she steers her best. It may not be out of place also to remark that, when in the canal, there is a certain speed attainable by each ship which she will not exceed, no matter how much the speed of the engines may be increased. This is owing to the large displacement of water as compared with the width and depth of the canal, and, it need scarcely be added, does not affect a vessel so much in the lakes.

In passing round a curve in the canal, in very long ships, the greatest caution must be exercised, and there should be a tug towing ahead. The engines should be stopped or moved as slowly as possible, that she may pass it at the slowest speed. This operation requires the utmost attention, especially in a vessel fitted with twin propellers, as regards the proximity of the propellers to the banks.

In passing the canal dredgers hauled into the banks and also vessels in the sidings, great caution is required. The speed should be very slow, as the reaction of the ship's wave, even if she is going at a moderate rate, is liable to make the stationary vessels snap their fastenings, and then fall foul of the ship under way.

All vessels should be steered from the bridge, the captain and the pilot, if possible, being alongside the helmsmen. The latter should be selected men.

The only serious damage vessels are liable to sustain in passing through the canal is from the propeller coming in contact with the bank; when the wind blows across the canal, care must be taken to prevent the ship drifting to leeward, and all possible upper gear should be sent down. It is better to stop and secure to the bollards than to risk damaging the propeller by using it near the lee bank. In stopping the engines, when fitted with a two-bladed propeller, a necessary precaution suggests itself, viz., to place the screw upright, not only on account of possible obstructions, but also from the well-known fact that a ship steers better with it in that position. With a beam wind, great care is required in getting under way from the Gares to prevent drifting on the lee bank. Hawfers fitted with spliced eyes are the most convenient for canal work.

The most difficult part of the canal passage, leaving the effect of a strong wind out of consideration, is between Suez and the Little Bitter lake, on account of the rapid tides that prevail in that space; and it has been recommended with good reason that this portion should be navigated either during the slack or against an opposing tide. Ships have frequently grounded in this locality, probably from disregard of this precaution.

Medical inspection.—No vessel is allowed to enter the canal from the southward without a medical inspection by the sanitary authorities at Suez. It is, therefore, necessary for all ships from the southward to anchor.

Homeward-bound passenger vessels are free to transit the canal in quarantine without communication with the shore; and most of the larger mail steamers have begun to do so. (*See page 47.*)

Anchoring.—Between Port Said and Port Thewfik, vessels can anchor only in lake Timsah, and in the Great Bitter lake. No ship is allowed to anchor in the canal except from unavoidable circumstances, and then only with the consent of the pilot.

When a ship is obliged to stop, a siding should, if possible, be reached. When one is not at hand, the vessel must be made fast head and stern to the weather bank. In either case, a vessel should show four white lights on the side where the channel is clear, viz.:—One light at the stem; one light on the bulwarks, one-third the distance from the stem to the stern; one light on the bulwarks, two-thirds the distance from the stem to the stern; and one light at the stern. The usual look-out must be kept.

Having in the preceding pages of this chapter described the Suez canal, with full directions for its passage, a description of the shoals and islands lying in or near the usual track of full powered steam vessels through the Red sea as described in Chapter I. is now given, deferring the description of the town and bay of Suez, with its port, Ibrahim, and the coasts and shoals of the gulf of Suez, to Chapter III., where they will be found commencing at page 84; it may, however, be here stated that the only shoals in the gulf of Suez which can be properly called central are the Sheratib which extend from the eastern shore off to the centre, and the Moresby shoal of 3 fathoms which is absolutely central.

The central islands and shoals of the Red sea are as follows:—The Brothers islets, Dædalus reef, Jebel Teir island, Zebayir islands, Avocet rock, Jebel Zukur and Abu Ail islands, Hanish islands, Haycocks, and Mohabbakah islands. With the exception of the first two, they all lie in the southern part of the sea.

THE BROTHERS are two small coral islets, bearing from each other N.W. $\frac{3}{4}$ W. and S.E. $\frac{3}{4}$ E., with a passage between them one mile wide. The northern islet, 33 feet high, is 3 cables long, and less than a cable wide. The lighthouse, presently described, stands near its centre; on the south-western side of the islet an iron jetty, 180 feet long, extends to the edge of the reef. The southern islet, 20 feet high, is one cable long, and about half a cable wide. The depths around both and between them are from 100 to 250 fathoms, and there are no indications of shoal water or of off-lying danger in any direction. They are steep-to, the fringe of coral extending only a few yards from high-water mark, with the exception of a small projection from the north-western end of the smaller islet, where there are 3 fathoms at a short distance from the point.

LIGHT.—From a circular white stone lighthouse, in lat. $26^{\circ} 19' N.$, long. $34^{\circ} 51' E.$, on the northern islet of the Brothers, is shown a *fixed white* light, at an elevation of 71 feet above the sea, visible in clear weather at the distance of 12 miles.

From Shadwân lighthouse, the Brothers lighthouse bears S.S.E. $\frac{1}{2}$ E. about 80 miles. Before the establishment of the light, these islets might

See chart, No. 8a; and plan, on No. 8b.

be seen 10 or 11 miles off by day, but at night, even in very clear weather, they could not be distinguished more than one or 2 miles distant. In passing the Brothers, especially at night, it is best to give them a wide berth, as a cross current often sets to the westward in their vicinity.

Tides.—It is high water, full and change, at the Brothers at 6 h.; the rise is 2 feet.

DÆDALUS REEF.—The Dædalus reef may be passed on either side; it bears S.S.E. $\frac{1}{2}$ E. 100 miles nearly from the Brothers light, and is in lat. $24^{\circ} 56'$ N., long. $35^{\circ} 52'$ E.; it consists of coral, with its surface a little below low water, and is 6 cables long N.W. and S.E. by $2\frac{1}{4}$ cables wide. There is very deep water close to its edge all round. A sand-bank, several feet high, is periodically formed on this reef, but it is washed away every year when the sea rises and strong winds blow.

LIGHT.—The lighthouse on the Dædalus reef is of open iron framework, and painted red; it stands 200 yards within the south-eastern extreme of the shoal, and shows a *fixed white* light at 61 feet above high water, visible in clear weather at the distance of 14 miles; see plan, and view on chart, No. 8 b.

From the Dædalus reef to Jebel Teir the distance is about 656 miles in a S.S.E. $\frac{3}{8}$ E. direction, and is clear of central dangers; but this line takes a vessel much nearer the eastern than the western side of the channel, and she would have to keep more in the centre after passing the outlying shoals of the Sawákin group, and when between the parallels of 18° and 17° N.

JEBEL TEIR ISLAND is very useful as a landfall, as, being steep-to, it may safely be run for even on a dark night, and the weather in the Red sea is seldom so thick, even on the darkest night, as to prevent such high land being seen. From the north-west and south-east, it appears high and conical in the centre, sloping gradually towards the extremes.

It is nearly circular in shape, being about $1\frac{3}{4}$ miles from north to south, and $1\frac{1}{2}$ miles wide, with soundings of 50 and 60 fathoms close to. There are some ruined huts on its N.N.W. side, but the island is without water. It is 800 feet above the level of the sea; from the base, it has a gradual ascent for half a mile, where a range of hills about 300 feet high commences and terminates in a steep rocky yellow bluff on the southern end of the island. From the top of this range is another gradual ascent to the peaks, which are also about 300 feet in height. The largest peak is of a brown colour, and the other forms a beautiful cone when seen from the south or west. The island is of recent volcanic origin, and composed chiefly of lava; sulphurous steam jets are found at the summit, but no smoke has been seen to issue for some years past.

See charts, Nos. 8b and 143.

There is a small sandy patch on the western side of Jebel Teir, where landing may be effected, but there is no anchorage near it. This island is known by three names: the Indians call it Jebel Teir, or hill of birds; the Shuris of Sohar near Maskat, Jebel Dokhan, or hill of smoke; and the Arabs and Abyssinians, Jebel Sebain, or hill without anchorage.

Soundings.—In crossing from the reef off the northern end of Okban island for Jebel Teir, 8 fathoms are found on the tail of Kotama reef; 16 miles from Okban, 38 fathoms, and, shortly after, the 100-fathoms line of soundings is crossed at about 12 miles from Jebel Teir. On the western side of Jebel Teir, the 100-fathoms contour-line is about 10 miles distant; and on both sides, between this line and the island, the water is very deep, from 300 to 700 fathoms. After passing the 100-fathoms line westward of Jebel Teir the water quickly shoals to 50 and 30 fathoms towards the African shore, and within 18 or 20 miles from Jebel Teir, on this side, there are patches of 16 or 18 fathoms. Shoals have at various times been reported in this neighbourhood, but, though carefully searched for by vessels detailed for the purpose, they have never been found, and it is probable that unless those who reported them were deceived by the appearances before alluded to, *see* page 23, the shoals lie considerably farther westward on the Dahalak bank, and therefore that the vessels themselves were out of the track.

ZEBAYIR ISLANDS.—This group of ten islets, besides rocks and shoals, extends in a N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E. direction, a distance of 13 miles. They are rugged and almost entirely devoid of vegetation, except in Saba where a few stunted bushes grow. Arab fishermen from Kamaran occasionally visit the islands.

Quoin island.—If passing close to the Zebayir islands on a dark night, a good look out should be kept for Quoin island, the northernmost rocky islet of the group; it is in the shape of a quoin, the highest part to the S.W., 100 feet high, not more than a cable in length, and being of a light brown colour is not easily distinguishable at such a time. There is deep water within $2\frac{1}{2}$ cables of it, however, but from its colour a vessel might approach very close without seeing it.

JEBEL ZEBAYIR, the south-easternmost island of the group, is the largest; it is about 3 miles in length north and south, and 2 miles wide. It has three remarkable hills; one, 734 feet high, forming a cone, on the southern side; another, 532 feet high, of a square shape, near the northern end; and, between the two, is the third or centre hill, 627 feet high. Centre-peak island, the next largest of the group, lies south-westward of Zebayir island; all the others are between Zebayir and Quoin island. Between Zebayir and Centre-peak islands is a channel with from

See chart, No. 143, and plan, No. 453.

15 to 20 fathoms water, and nearly half a mile wide, through which the current runs strongly in a fresh breeze.

Centre-peak island, the south-westernmost of the group, is rather more than a mile in diameter and nearly circular, with a small bay on its south-western side; rising from a rocky shore, it forms three hills, the central one, of 566 feet elevation, being the highest. The island is steep-to, and the water so deep that the lead is of little use in the approach.

Saba island, north-westward of Jebel Zebayir, is about a mile in extent, nearly round, and consists of a sandy plain from which rise two remarkable hills; the higher one, 381 feet high, appears like a barn when approached from the eastward; both hills have craters. It has also two lagoons, which are connected with the sea and fringed with mangroves.

Connected island is a rugged-topped rock, 473 feet high, of remarkable shape, south-westward of Saba island, about half a mile distant and connected with it by the coral reef which skirts the shores of both islands.

Anchorage.—Between Jebel Zebayir and Saba is a channel about half a mile wide, but, for vessels of deep draught, narrowed to less than half that width by shoal water extending from each side. Anchorage, with shelter from the prevailing winds, may be obtained in from 8 to 10 fathoms in the centre of this channel, the southern hill of Jebel Zebayir bearing S.S.E. and the northern extreme of that island E. by N. $\frac{1}{2}$ N. In this berth, the summit of Table-peak island is open southward of the highest hill in Saba, and the Shoe rock is nearly on with the northern extreme of Connected island. Table-peak should not be shut in behind Saba, as the vessel would then be close to the edge of the deep water.

Middle reef, $1\frac{1}{2}$ miles N.N.W. of the high hill on Saba island, and nearly 2 miles S.E. $\frac{3}{4}$ E. from Table-peak, is of coral, about a quarter of a mile in extent, and has deep water within a short distance. The reef breaks when there is any swell. The north extreme of Saba island on with the summit of the northern hill of Jebel Zebayir S.E. $\frac{1}{2}$ S. leads westward of the reef.

Low island, Saddle island, Table-peak, and Rugged island.—Saddle island, 583 feet high, Table-peak, 526 feet, and Rugged island, 510 feet, are each about half a mile in length and barren in appearance; they are situated on a rocky bank, which extends from them one mile to the southward and south-eastward. Here, 5 cables southward of Saddle island, is Low island, about 2 cables in length and 125 feet high, and nearly 5 cables eastward of Low island is a rock 26 feet high. About 5 cables north-westward from Saddle island are other rocks above water, with deep water between them and the island; the highest of these rocks is 83 feet.

Between Saddle island and Table-peak there are from 3 to 5 fathoms across the bank, and between Table-peak and Rugged island there are 6, 9, and 17 fathoms, rock and sand. Between Saddle island and the rock eastward of Low island there are 5 fathoms.

Haycock island, $1\frac{1}{4}$ miles N.N.E. from Ragged island, S.E. $\frac{3}{4}$ E., nearly $3\frac{1}{2}$ miles from Quoin island, and 545 feet high, is steep-to, and there is a navigable passage about a mile wide between it and Rugged island. Between it and Quoin island are patches with as little as 9 or 10 fathoms on them, and very deep water close to.

The off-lying rocks and shoals of the group are all towards its southern and eastern sides. They are as follows :—

East rock, 5 feet high, lies N.E. $\frac{3}{4}$ N. $3\frac{1}{10}$ miles from the north peak of Zebayir island; and, $1\frac{1}{2}$ cables north-west of East rock is a sunken rock. The sea often breaks heavily on these dangers; there is deep water within half a mile on all sides.

Williamson shoal lies between East rock and Jebel Zebayir, its shoalest spot of 5 fathoms being about 8 cables from the latter. The shoal is nearly 3 cables in diameter.

Evans rock, E. $\frac{1}{4}$ S. about $1\frac{1}{2}$ miles from the southern point of Jebel Zebayir, is a small pinnacle with only 4 fathoms; there are about 10 fathoms within a cable all round the rock.

Shark shoal, a coral reef about 5 cables in extent, bears S.E. by E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles from Centre-peak island. This shoal, so named from the large number of sharks seen on it, has a depth of 7 fathoms in its centre and is surrounded by deep water. Tide rips are often seen in its vicinity.

Penguin shoal.—South-eastward of Zebayir island, in lat. $14^{\circ} 57' 15''$ N. and long. $42^{\circ} 20' 25''$ E., H.M.S. *Sylvia*, in 1888, obtained soundings in 14 fathoms, rock. No shoaler water was then found; but in 1890 H.M.S. *Penguin* discovered as little as 22 feet at this spot. The locality has not yet been completely examined, but this shoal lies exactly in the track of ships passing eastward of the Zebayir islands, which, however, they should never do, as there may be other similar shoal spots in the neighbourhood.

AVOCET ROCK.—This dangerous rock, in lat. $14^{\circ} 22' 8''$ N., long. $42^{\circ} 41' 32''$ E., was discovered by the steamships *Avocet* and *Teddington* striking on it in the year 1887. After three ineffectual searches, it was re-discovered by H.M.S. *Stork*, Commander T. J. Pullen, in 1888, and its correct position fixed. It is a small coral patch, with a least depth of 15 feet, and from 28 to 30 fathoms close to all round; from it, the highest peak of Jebel Zukur bears S. $\frac{3}{8}$ E., and High island is distant 17 miles.

Directions.—In passing westward of the Zebayir islands, and steaming against a southerly gale, so commonly met with during the winter season, it is advisable to give them a berth, of at least a mile as the set of the swell is towards the rocks.

From that distance westward of Centre-peak island to mid-channel between Jebel Zukur and Abu Ail the course and distance is S.S.E. $\frac{3}{4}$ E. 66 miles, and it is necessary to repeat that this course only leads $5\frac{1}{2}$ miles westward of the Avocet rock; great care should therefore be taken to keep westward of that rock, bearing in mind the repeated cautions given as to the cross currents so frequently experienced in this sea.

Bank.—A sounding of 18 fathoms was reported by the s.s. *Yarca*, as having been obtained (1892) near the "track usually followed" north-north-west of Jebel Zukur island, lying with Avocet rock bearing N. 77° E., distant $7\frac{1}{2}$ miles. Position, to be considered doubtful, lat. $14^{\circ} 19\frac{3}{4}'$ N., long. $42^{\circ} 33\frac{3}{4}'$ E. This locality was examined by H.M.S. *Egeria*, 1894, when the least depth found was 35 fathoms.

JEBEL ZUKUR and HANISH ISLANDS.—The islands comprising this group are mostly volcanic hills of a dark barren aspect, with rocky eminences in fanciful shapes, covered with a loose, granular, black, brown, or sandy-coloured earth and ashes, or strewn with pieces of sharp rock. The principal islands are Jebel Zukur and Great Hanish; they are surrounded by many smaller ones of various heights, named chiefly according to their different shapes. In some of the largest the craters are very evident, having all the appearance of being originally high peaked islands, reduced to the present saucer shape by internal explosions. The neighbouring smaller islands and rocks E.S.E., South, and S.W. of Great Hanish are of similar formation.

From the southern end of Jebel Zukur to Ras Beilul on the African shore, a distance of 43 miles, these islands, islets, and rocks form a continuous chain extending in a S.S.W. direction, Sayal island, the southernmost of the group, being only six miles from that point.

Tides and Currents.—It is high water, full and change, on the northern side of Jebel Zukur, at 1 h.; springs rise $2\frac{1}{2}$ feet, neaps one foot, according to observations made by H.M.S. *Fawn* in February, March, and April, 1881. The tidal streams are very irregular, but along the shores of the islands they appear to be constant. At the anchorage at the northern end of Jebel Zukur, H.M.S. *Thalia*, in 1872, found the flood set south-westward at $2\frac{1}{2}$ miles an hour, and, the ebb north-eastward. Between Low island and Little Hanish, the ebb runs to the southward, and continues running $1\frac{1}{2}$ hours after low water at Jebel Zukur; the flood sets northward about 6 hours, along the eastern coast of Great Hanish, at nearly a knot an hour. The ebb

See plan, No. 453.

sets strongly to the southward round the south-western coast of Great Hanish; off Haycock island, tide rips are visible and the ebb sets south-eastward.

In the month of May, off 3-foot rock (south-west of Suyul-Hanish) a constant current was observed setting S.S.E. $1\frac{1}{2}$ knots an hour.*

JEBEL ZUKUR, the highest island in this sea, is nearly 10 miles long from north to south, by 7 miles wide, and is composed of a series of lofty hills of barren aspect, which in some views appear as sharp peaks; but, to a vessel running along the eastern side of the island, they assume the appearance of the inner side of a funnel; the highest peak is 2,047 feet high. The northern coast of Jebel Zukur is fringed by a reef which, westward of North point, a low and sandy point with a few green bushes near it, extends about half a mile from the shore. West point, as also all the points on the western, southern, and eastern coasts, as far as East point, may be approached within a quarter of a mile.

Between North and East points, however, the shore, which forms the western side of the Abu Ail channel, is fringed by a reef which, in some parts, extends nearly 2 cables off; East point, low and rocky, is almost steep-to, with the exception of a rock with 15 feet water, 2 cables E.N.E. from the point, reported by Captain Fowler of the Liverpool Salvage Association in 1883; this part of the island, therefore, should be given a wider berth.

A bank with 12 fathoms lies E. by S. $\frac{3}{4}$ S. $1\frac{1}{4}$ miles from East point.

* Lieut. Frederick, H.M.S. *Sylvia*, remarked on the currents in the southern part of the Red sea in 1887:—"Between Jebel Teir and the Zebayir islands an easterly set of nearly a knot an hour was experienced in the month of December; the wind at the time and for at least two days previously was nearly calm and the sea perfectly smooth. On two previous occasions I have noticed the same phenomenon when passing Jebel Teir, and in one instance the easterly set continued for 10 or 15 miles north of Jebel Teir."

"While sounding in the vicinity of Ras Mujamela and of the Avocet rock during the months of October, November, and December, little or no current was experienced, although the southerly wind was blowing almost continuously."

"On the Egyptian coast, between Rakhmat island and Ras Fatima, a northerly set of about three-quarters of a knot was experienced; and from abreast of Ras Makawar to Perim, the current was running nearly 2 knots an hour in the centre of the channel."

In 1888, the same officer remarked, that from 20th May to 1st June, "between Jebel Teir and the Zebayir islands and the 100-fathoms bank to the eastward, the general set of the current was to the northward (N.W. by N. to N.N.E.) with a rate of from one-tenth of a knot to one knot an hour. On the bank, the current was very erratic; opposite Jebel Teir, generally to the southward, but, farther south, to the eastward and northward."

"During June, the current between Zebayir islands and Jebel Teir was inappreciable."

"From Hanish islands to Perim, with a strong north-westerly breeze, the current was $1\frac{1}{2}$ knots S. by E., but with a light breeze from the same direction, it was South three-tenths of a knot"

Anchorage.—There is good shelter from southerly winds near the northern end of Jebel Zukur in 11 fathoms, sand and coral, with the southern end of Quoin island (Abu Ail) just open of North point, East; an ancient tomb near the beach S. by W. $\frac{1}{4}$ W.; and the highest peak of Jebel Zukur S. $\frac{1}{8}$ E. The tomb is a square building of naturally dark stone, but the sea face was whitewashed by the surveyors in 1881.

In this berth, a vessel lies $2\frac{1}{2}$ cables from the reef fringing the coast and opposite an opening through which boats may pass and lie securely inside; the opening, however, is narrow, and to avoid a dangerous rock on the eastern side, boats should keep as close as possible to the breakers on the western side.

Off the north-western shore generally, there is anchorage in from 7 to 10 fathoms close in, and in 23 fathoms 5 cables from the shore, but the bottom in this part is rocky.

There is also good anchorage in South bay, and that in its north-western part is better than the north-eastern. Here a vessel should anchor in about 8 fathoms, midway between Near island and the shore of Zukur eastward of it, with the northern end of Near island bearing N.W. by W. $\frac{3}{4}$ W. There are a few straggling huts on the shore, and some trees. Across the entrance of the bay, the soundings are from 30 to 36 fathoms, with an irregular decrease, there being 9 fathoms a short distance from the shore reef in the western bight, and 9, 13, and 15 fathoms in the eastern.

Water.—Good water may be obtained about $1\frac{1}{2}$ miles northward of the bay formed by Sandy Peak island, by digging a hole in the sand, which is black; it is, however, difficult to get it off in casks over the rugged reef with which the shore is lined.

Wood may also be had on the northern and southern parts of Jebel Zukur, and grass in some of the valleys, where antelopes are found. There are no constant residents on this island, but it is resorted to by fishermen from Kamaran and Makalla in search of various Red sea productions, amongst which are sharks' fins, salt fish, and turtle. The fishermen generally remain from February until May or June.

High island, 216 feet high and having a flat appearance, lies North from the northern end of Jebel Zukur; from which it is separated by a navigable channel half a mile wide and 19 fathoms deep. The island may be approached on all sides to the distance of a cable.

ABU AIL ISLANDS lie E. $\frac{1}{4}$ N. 3 miles from North point, Jebel Zukur; Quoin island, the westernmost, is 345 feet high, and from the northward makes as a pyramid; Pile island, the easternmost, is 287 feet high. They are of a whitish-brown colour, and are therefore not so easily seen at night as islands of a darker shade; they have a bold

and steep appearance, and are entirely destitute of vegetation. Landing may be effected on the eastern side of Quoin island, but with difficulty. Pile island is an inaccessible pile of rock. On the south-west side of Quoin island, at the distance of about $2\frac{1}{2}$ cables, there is a ledge of rocks 6 feet high with foul ground extending in an E.S.E. and W.N.W. direction for $2\frac{1}{2}$ cables. The narrow channel between the rocks and Quoin island has a depth of 13 fathoms but should not be attempted.

Abu Ail channel.—This channel between Quoin island and Jebel Zukur, is more than 2 miles wide at the narrowest part, and the mid-channel soundings are from 40 to 50 fathoms. Until the rocks lying off Quoin island are passed, vessels from the northward should keep on the Jebel Zukur side as the safest; but, having passed those rocks, East point, Jebel Zuku, should be given a good berth, both on account of the 15-foot rock off it, and of the tidal streams which are here very irregular and occasionally set across the channel. This should be specially observed at night or in hazy weather, when the high land of Jebel Zukur has a peculiar distant appearance, and East point, being low, with white sand behind, easily mistaken for water, is not seen until a vessel is dangerously close to it.

Tongue island, so called from its shape, is 166 feet high and more than 2 miles from the south-western end of Jebel Zukur, with a clear deep channel between them; it has on its southern side a low reef of rocks above water, the whole forming a circular basin about 3 cables in diameter. The depths in the basin are from 18 to 22 fathoms; boats can enter on the eastern side, through a passage having a depth of 10 feet.

LITTLE HANISH, about $1\frac{3}{4}$ miles southward of Jebel Zukur, and separated from it by a channel with from 30 to 40 fathoms water, is 627 feet high, 3 miles long, and $1\frac{1}{4}$ miles wide; it has a remarkable piece of land on the summit of the eastern end, which, when observed from Great Hanish, resembles a thumb or small peak in the act of falling, and is therefore named Tumble-down peak. The island is rugged, with grass in some parts. A few antelopes are found.

Off the north-eastern side of Little Hanish, about a mile distant, are some rocky islets connected with that part of Little Hanish by sunken rocks; the northern islet is 88 feet high. Off the eastern coast is a chain of islets about 2 miles long, and separated from Little Hanish by a navigable channel nearly half a mile wide. Low island, the largest of the chain, is 48 feet high, and off its eastern side, nearly a cable from the shore, is a rock 35 feet high; and, a cable and a half outside this, is the Fawn rock, nearly awash at low water.

A rocky 7-fathoms patch lies E. by S. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from Tumble-down peak, and $1\frac{1}{4}$ miles from the nearest part of Low island. Although 7 fathoms was the least water found during the survey, it is possible,

considering the nature of the ground, that shoaler water may exist. Vessels, therefore, should give Low island a wide berth.

Anchorage, in 16 fathoms, with good shelter from southerly winds, may be found in the channel between Little Hanish and Low island, with the southern part of Low island just open of its western point, and the little islet off its northern end bearing N.E. $\frac{3}{4}$ E. Another berth, farther south is in 17 fathoms, with the southern end of Low island bearing South, and the small islet off the northern end kept a little open.

GREAT HANISH, separated from Little Hanish by a channel nearly 3 miles wide with from 30 to 45 fathoms water, is 10 miles long N.E. and S.W., by about 3 miles wide at its broadest part. The highest part, 1,335 feet high, is near the centre, and, as seen from some directions, appears as a remarkable bluff. A strip of sand crosses the island at 3 miles from the southern end, and the land on either side being high, the southern part, from a distance, has the appearance of being a separate island. The south-western end of the island is steep to on its western side, having no bottom at 100 fathoms close in shore, in some places. There is a good deal of grass in the valleys and many antelopes.

Anchorage.—Along the eastern side of the island, outside the fringing reef, the soundings are tolerably regular, affording anchorage and good shelter in northerly winds. One of these anchorages is near the northern end of the island, from 6 to 8 cables from the shore, in from 7 to 12 fathoms, with Haycock island just open of the north-east point of Great Hanish; another is nearer the shore in about 11 fathoms, with North Round island bearing about E. by N., and the Chor rock S. $\frac{3}{4}$ W.; but the best anchorage is farther southward, in 16 fathoms, with Double-peak island bearing about S.E. There is also anchorage in South-east bay, at the southern end of Great Hanish.

The following are the smaller islets and rocks lying near Great Hanish—they are nearly all eastward or southward of the island except the South-west rocks, and the dangerous Marescaux rock now to be described.

Marescaux rock.—This rock, with only 6 feet water, lies $1\frac{1}{2}$ miles from the nearest shore off the north-western side of Great Hanish. The rock is of small extent, and the sea generally breaks on it, but the ground in the neighbourhood has not been examined, and the locality should be avoided. From it, the northern extremes of Peaky island, 107 feet high, and of Great Hanish, are just in line.

Haycock island, 519 feet high, is separated from the north-eastern point of Great Hanish by a narrow channel having general depths of 9 or 10 fathoms; but nearly in mid-channel, though nearest to the

Haycock shore, there is a sunken rock having only 6 feet. The island resembles a haycock from the southward, but on passing close eastward of it, the inside appears to be hollowed out like a saucer.

Currents run strongly round Haycock island, and a whirl or eddy is seen off the coast of Great Hanish southward of the Haycock. There are also tide rips between the Haycock and Mushéjera.

Addar Ail.—This small group of rocky islets, the highest being 120 feet, is nearly a mile distant from the eastern side of the Haycock, and in the channel between them the depth is about 28 fathoms; they form a circular basin, $1\frac{1}{2}$ cables in diameter, with a small opening on its southern edge.

Mushéjera, a small islet bearing E. by S. $2\frac{3}{4}$ miles from the highest part of the Haycock, is about 24 feet high, and nearly a cable in length. On its southern and western sides it may be safely approached to a distance of 2 cables, but a dangerous reef extends 3 cables eastward and north-eastward of it, and the island being low is not easily seen at night. The passage between Mushéjera and Addar Ail is clear.

North Round island and Quoin island, 360 and 229 feet high respectively, and both named from their shape, are from $1\frac{1}{4}$ to 2 miles from the centre of the eastern side of Great Hanish, with a 20-fathoms channel between them and it. The channel between the two islands is also clear, and has a depth of 11 fathoms.

Chor rock.—At $2\frac{3}{4}$ miles S.W. by W. from North Round island, and 7 cables from the shore of Great Hanish, are some black rocks, the Chor rock, the highest, being 72 feet above water, with from 6 to 9 fathoms, rocky bottom, on their eastern side, and from 12 to 17 fathoms half a mile off in the same direction, increasing to 24 fathoms between them and the Round islands, whilst between the Chor rock and the shore is a channel with from 7 to 9 fathoms.

SUYUL-HANISH ISLANDS, three in number, and connected by a reef, together occupy a space nearly $3\frac{1}{2}$ miles long N.N.E. $\frac{3}{4}$ E. and S.S.W. $\frac{3}{4}$ W., and their south-western end is about 3 miles from the south-eastern part of Great Hanish; their northern end is less than $1\frac{3}{4}$ miles from that island, between which and them is a navigable channel with the Pin and Cust rocks in the middle of its southern entrance, and the Chor rock in its northern. The islands are of considerable height: Double-peak island, the northernmost, is 446 feet high and very steep, with two small peaks close together; Suyul-Hanish, the southernmost and largest, is 2 miles long, one mile wide at its southern end, 381 feet high, and very rugged. Temporary anchorage may be found on its eastern

Directions.—In passing westward of the Zebayir islands, and steaming against a southerly gale, so commonly met with during the winter season, it is advisable to give them a berth, of at least a mile as the set of the swell is towards the rocks.

From that distance westward of Centre-peak island to mid-channel between Jebel Zukur and Abu Ail the course and distance is S.S.E. $\frac{3}{4}$ E. 66 miles, and it is necessary to repeat that this course only leads $5\frac{1}{2}$ miles westward of the Avocet rock; great care should therefore be taken to keep westward of that rock, bearing in mind the repeated cautions given as to the cross currents so frequently experienced in this sea.

Bank.—A sounding of 18 fathoms was reported by the s.s. *Yarra*, as having been obtained (1892) near the "track usually followed" north-north-west of Jebel Zukur island, lying with Avocet rock bearing N. 77° E., distant $7\frac{1}{2}$ miles. Position, to be considered doubtful, lat. $14^{\circ} 19\frac{3}{4}'$ N., long. $42^{\circ} 33\frac{3}{4}'$ E. This locality was examined by H.M.S. *Egeria*, 1894, when the least depth found was 35 fathoms.

JEBEL ZUKUR and HANISH ISLANDS.—The islands comprising this group are mostly volcanic hills of a dark barren aspect, with rocky eminences in fanciful shapes, covered with a loose, granular, black, brown, or sandy-coloured earth and ashes, or strewn with pieces of sharp rock. The principal islands are Jebel Zukur and Great Hanish; they are surrounded by many smaller ones of various heights, named chiefly according to their different shapes. In some of the largest the craters are very evident, having all the appearance of being originally high peaked islands, reduced to the present saucer shape by internal explosions. The neighbouring smaller islands and rocks E.S.E., South, and S.W. of Great Hanish are of similar formation.

From the southern end of Jebel Zukur to Ras Beilul on the African shore, a distance of 43 miles, these islands, islets, and rocks form a continuous chain extending in a S.S.W. direction, Sayal island, the southernmost of the group, being only six miles from that point.

Tides and Currents.—It is high water, full and change, on the northern side of Jebel Zukur, at 1 h.; springs rise $2\frac{1}{2}$ feet, neaps one foot, according to observations made by H.M.S. *Fawn* in February, March, and April, 1881. The tidal streams are very irregular, but along the shores of the islands they appear to be constant. At the anchorage at the northern end of Jebel Zukur, H.M.S. *Thalia*, in 1872, found the flood set south-westward at $2\frac{1}{2}$ miles an hour, and, the ebb north-eastward. Between Low island and Little Hanish, the ebb runs to the southward, and continues running $1\frac{1}{2}$ hours after low water at Jebel Zukur; the flood sets northward about 6 hours, along the eastern coast of Great Hanish, at nearly a knot an hour. The ebb

sets strongly to the southward round the south-western coast of Great Hanish; off Haycock island, tide rips are visible and the ebb sets south-eastward.

In the month of May, off 3-foot rock (south-west of Suyul-Hanish) a constant current was observed setting S.S.E. $1\frac{1}{2}$ knots an hour.*

JEBEL ZUKUR, the highest island in this sea, is nearly 10 miles long from north to south, by 7 miles wide, and is composed of a series of lofty hills of barren aspect, which in some views appear as sharp peaks; but, to a vessel running along the eastern side of the island, they assume the appearance of the inner side of a funnel; the highest peak is 2,047 feet high. The northern coast of Jebel Zukur is fringed by a reef which, westward of North point, a low and sandy point with a few green bushes near it, extends about half a mile from the shore. West point, as also all the points on the western, southern, and eastern coasts, as far as East point, may be approached within a quarter of a mile.

Between North and East points, however, the shore, which forms the western side of the Abu Ail channel, is fringed by a reef which, in some parts, extends nearly 2 cables off; East point, low and rocky, is almost steep-to, with the exception of a rock with 15 feet water, 2 cables E.N.E. from the point, reported by Captain Fowler of the Liverpool Salvage Association in 1883; this part of the island, therefore, should be given a wider berth.

A bank with 12 fathoms lies E. by S. $\frac{3}{4}$ S. $1\frac{1}{4}$ miles from East point.

* Lieut. Frederick, H.M.S. *Sylvia*, remarked on the currents in the southern part of the Red sea in 1887:—"Between Jebel Teir and the Zebayir islands an easterly set of nearly a knot an hour was experienced in the month of December; the wind at the time and for at least two days previously was nearly calm and the sea perfectly smooth. On two previous occasions I have noticed the same phenomenon when passing Jebel Teir, and in one instance the easterly set continued for 10 or 15 miles north of Jebel Teir."

"While sounding in the vicinity of Ras Mujamela and of the Avocet rock during the months of October, November, and December, little or no current was experienced, although the southerly wind was blowing almost continuously."

"On the Egyptian coast, between Rakhmat island and Ras Fatima, a northerly set of about three-quarters of a knot was experienced; and from abreast of Ras Makawar to Perim, the current was running nearly 2 knots an hour in the centre of the channel."

In 1888, the same officer remarked, that from 20th May to 1st June, "between Jebel Teir and the Zebayir islands and the 100-fathoms bank to the eastward, the general set of the current was to the northward (N.W. by N. to N.N.E.) with a rate of from one-tenth of a knot to one knot an hour. On the bank, the current was very erratic; opposite Jebel Teir, generally to the southward, but, farther south, to the eastward and northward."

"During June, the current between Zebayir islands and Jebel Teir was inappreciable."

"From Hanish islands to Perim, with a strong north-westerly breeze, the current was $1\frac{1}{2}$ knots S. by E., but with a light breeze from the same direction, it was South three-tenths of a knot"

Anchorage.—There is good shelter from southerly winds near the northern end of Jebel Zukur in 11 fathoms, sand and coral, with the southern end of Quoin island (Abu Ail) just open of North point, East; an ancient tomb near the beach S. by W. $\frac{1}{4}$ W.; and the highest peak of Jebel Zukur S. $\frac{7}{8}$ E. The tomb is a square building of naturally dark stone, but the sea face was whitewashed by the surveyors in 1881.

In this berth, a vessel lies $2\frac{1}{2}$ cables from the reef fringing the coast and opposite an opening through which boats may pass and lie securely inside; the opening, however, is narrow, and to avoid a dangerous rock on the eastern side, boats should keep as close as possible to the breakers on the western side.

Off the north-western shore generally, there is anchorage in from 7 to 10 fathoms close in, and in 23 fathoms 5 cables from the shore, but the bottom in this part is rocky.

There is also good anchorage in South bay, and that in its north-western part is better than the north-eastern. 'Here a vessel should anchor in about 8 fathoms, midway between Near island and the shore of Zukur eastward of it, with the northern end of Near island bearing N.W. by W. $\frac{3}{4}$ W. There are a few straggling huts on the shore, and some trees. Across the entrance of the bay, the soundings are from 30 to 36 fathoms, with an irregular decrease, there being 9 fathoms a short distance from the shore reef in the western bight, and 9, 13, and 15 fathoms in the eastern.

Water.—Good water may be obtained about $1\frac{1}{2}$ miles northward of the bay formed by Sandy Peak island, by digging a hole in the sand, which is black; it is, however, difficult to get it off in casks over the rugged reef with which the shore is lined.

Wood may also be had on the northern and southern parts of Jebel Zukur, and grass in some of the valleys, where antelopes are found. There are no constant residents on this island, but it is resorted to by fishermen from Kamaran and Makalla in search of various Red sea productions, amongst which are sharks' fins, salt fish, and turtle. The fishermen generally remain from February until May or June.

High island, 216 feet high and having a flat appearance, lies North from the northern end of Jebel Zukur; from which it is separated by a navigable channel half a mile wide and 19 fathoms deep. The island may be approached on all sides to the distance of a cable.

ABU AIL ISLANDS lie E. $\frac{1}{4}$ N. 3 miles from North point, Jebel Zukur; Quoin island, the westernmost, is 345 feet high, and from the northward makes as a pyramid; Pile island, the easternmost, is 287 feet high. They are of a whitish-brown colour, and are therefore not so easily seen at night as islands of a darker shade; they have a bold

and steep appearance, and are entirely destitute of vegetation. Landing may be effected on the eastern side of Quoin island, but with difficulty. Pile island is an inaccessible pile of rock. On the south-west side of Quoin island, at the distance of about $2\frac{1}{2}$ cables, there is a ledge of rocks 6 feet high with foul ground extending in an E.S.E. and W.N.W. direction for $2\frac{1}{2}$ cables. The narrow channel between the rocks and Quoin island has a depth of 13 fathoms but should not be attempted.

Abu Ail channel.—This channel between Quoin island and Jebel Zukur, is more than 2 miles wide at the narrowest part, and the mid-channel soundings are from 40 to 50 fathoms. Until the rocks lying off Quoin island are passed, vessels from the northward should keep on the Jebel Zukur side as the safest; but, having passed those rocks, East point, Jebel Zuku, should be given a good berth, both on account of the 15-foot rock off it, and of the tidal streams which are here very irregular and occasionally set across the channel. This should be specially observed at night or in hazy weather, when the high land of Jebel Zukur has a peculiar distant appearance, and East point, being low, with white sand behind, easily mistaken for water, is not seen until a vessel is dangerously close to it.

Tongue island, so called from its shape, is 166 feet high and more than 2 miles from the south-western end of Jebel Zukur, with a clear deep channel between them; it has on its southern side a low reef of rocks above water, the whole forming a circular basin about 3 cables in diameter. The depths in the basin are from 18 to 22 fathoms; boats can enter on the eastern side, through a passage having a depth of 10 feet.

LITTLE HANISH, about $1\frac{1}{2}$ miles southward of Jebel Zukur, and separated from it by a channel with from 30 to 40 fathoms water, is 627 feet high, 3 miles long, and $1\frac{1}{4}$ miles wide; it has a remarkable piece of land on the summit of the eastern end, which, when observed from Great Hanish, resembles a thumb or small peak in the act of falling, and is therefore named Tumble-down peak. The island is rugged, with grass in some parts. A few antelopes are found.

Off the north-eastern side of Little Hanish, about a mile distant, are some rocky islets connected with that part of Little Hanish by sunken rocks; the northern islet is 88 feet high. Off the eastern coast is a chain of islets about 2 miles long, and separated from Little Hanish by a navigable channel nearly half a mile wide. Low island, the largest of the chain, is 48 feet high, and off its eastern side, nearly a cable from the shore, is a rock 35 feet high; and, a cable and a half outside this, is the Fawn rock, nearly awash at low water.

A rocky 7-fathoms patch lies E. by S. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from Tumble-down peak, and $1\frac{1}{4}$ miles from the nearest part of Low island. Although 7 fathoms was the least water found during the survey, it is possible,

considering the nature of the ground, that shoaler water may exist. Vessels, therefore, should give Low island a wide berth.

Anchorage, in 16 fathoms, with good shelter from southerly winds, may be found in the channel between Little Hanish and Low island, with the southern part of Low island just open of its western point, and the little islet off its northern end bearing N.E. $\frac{3}{4}$ E. Another berth, farther south is in 17 fathoms, with the southern end of Low island bearing South, and the small islet off the northern end kept a little open.

GREAT HANISH, separated from Little Hanish by a channel nearly 3 miles wide with from 30 to 45 fathoms water, is 10 miles long N.E. and S.W., by about 3 miles wide at its broadest part. The highest part, 1,335 feet high, is near the centre, and, as seen from some directions, appears as a remarkable bluff. A strip of sand crosses the island at 3 miles from the southern end, and the land on either side being high, the southern part, from a distance, has the appearance of being a separate island. The south-western end of the island is steep to on its western side, having no bottom at 100 fathoms close in shore, in some places. There is a good deal of grass in the valleys and many antelopes.

Anchorage.—Along the eastern side of the island, outside the fringing reef, the soundings are tolerably regular, affording anchorage and good shelter in northerly winds. One of these anchorages is near the northern end of the island, from 6 to 8 cables from the shore, in from 7 to 12 fathoms, with Haycock island just open of the north-east point of Great Hanish; another is nearer the shore in about 11 fathoms, with North Round island bearing about E. by N., and the Chor rock S. $\frac{3}{4}$ W.; but the best anchorage is farther southward, in 16 fathoms, with Double-peak island bearing about S.E. There is also anchorage in South-east bay, at the southern end of Great Hanish.

The following are the smaller islets and rocks lying near Great Hanish—they are nearly all eastward or southward of the island except the South-west rocks, and the dangerous Marescaux rock now to be described.

Marescaux rock.—This rock, with only 6 feet water, lies $1\frac{1}{3}$ miles from the nearest shore off the north-western side of Great Hanish. The rock is of small extent, and the sea generally breaks on it, but the ground in the neighbourhood has not been examined, and the locality should be avoided. From it, the northern extremes of Peaky island, 107 feet high, and of Great Hanish, are just in line.

Haycock island, 519 feet high, is separated from the north-eastern point of Great Hanish by a narrow channel having general depths of 9 or 10 fathoms; but nearly in mid-channel, though nearest to the

See plan, No. 453.

Haycock shore, there is a sunken rock having only 6 feet. The island resembles a haycock from the southward, but on passing close eastward of it, the inside appears to be hollowed out like a saucer.

Currents run strongly round Haycock island, and a whirl or eddy is seen off the coast of Great Hanish southward of the Haycock. There are also tide rips between the Haycock and Mushéjera.

Addar Ail.—This small group of rocky islets, the highest being 120 feet, is nearly a mile distant from the eastern side of the Haycock, and in the channel between them the depth is about 28 fathoms; they form a circular basin, $1\frac{1}{2}$ cables in diameter, with a small opening on its southern edge.

Mushéjera, a small islet bearing E. by S. $2\frac{3}{4}$ miles from the highest part of the Haycock, is about 24 feet high, and nearly a cable in length. On its southern and western sides it may be safely approached to a distance of 2 cables, but a dangerous reef extends 3 cables eastward and north-eastward of it, and the island being low is not easily seen at night. The passage between Mushéjera and Addar Ail is clear.

North Round island and Quoin island, 360 and 229 feet high respectively, and both named from their shape, are from $1\frac{1}{4}$ to 2 miles from the centre of the eastern side of Great Hanish, with a 20-fathoms channel between them and it. The channel between the two islands is also clear, and has a depth of 11 fathoms.

Chor rock.—At $2\frac{3}{4}$ miles S.W. by W. from North Round island, and 7 cables from the shore of Great Hanish, are some black rocks, the Chor rock, the highest, being 72 feet above water, with from 6 to 9 fathoms, rocky bottom, on their eastern side, and from 12 to 17 fathoms half a mile off in the same direction, increasing to 24 fathoms between them and the Round islands, whilst between the Chor rock and the shore is a channel with from 7 to 9 fathoms.

SUYUL-HANISH ISLANDS, three in number, and connected by a reef, together occupy a space nearly $3\frac{1}{2}$ miles long N.N.E. $\frac{3}{4}$ E. and S.S.W. $\frac{3}{4}$ W., and their south-western end is about 3 miles from the south-eastern part of Great Hanish; their northern end is less than $1\frac{1}{4}$ miles from that island, between which and them is a navigable channel with the Pin and Cust rocks in the middle of its southern entrance, and the Chor rock in its northern. The islands are of considerable height: Double-peak island, the northernmost, is 446 feet high and very steep, with two small peaks close together; Suyul-Hanish, the southernmost and largest, is 2 miles long, one mile wide at its southern end, 381 feet high, and very rugged. Temporary anchorage may be found on its eastern

side. Mid island, circular in shape and about 2 cables in diameter lies between the two islands.

Pin rock, 12 feet high, lies nearly midway between the southern points of Great Hanish and Suyul-Hanish, and may be approached closely, except on the western side, where the Cust rock, a sunken rock, lies W.N.W. about 7 cables from the Pin. There is deep water between the latter and the Cust rock.

Ship and Three-foot rocks.—The Ship rock, a dangerous sunken rock with 6 feet water, lies S.W. by W. from the peak of Suyul-Hanish, and about $8\frac{1}{2}$ cables from the nearest part of that island. The Three-foot rock, a small rock of fine vesicular lava, standing 3 feet above the water, is situated S.W. $\frac{3}{4}$ W. from Suyul-Hanish peak, and $2\frac{1}{2}$ miles from the nearest part of that island; it lies $1\frac{1}{2}$ miles outside the Ship rock, and has deep water close-to.

South Round island and Rocky islands.—Eastward of Double-peak island, $2\frac{1}{4}$ miles distant, is South Round island, 87 feet high and dark in appearance; and $1\frac{1}{4}$ miles south-westward of South Round island are the Rocky islands, consisting of black rugged rocks, the highest 55 feet above the sea.

The Parkin rock, a small rock 11 feet high and nearly $2\frac{1}{2}$ miles S. by E. from South Round island, is the south-eastern rock of the Hanish group. From it, Suyul-Hanish peak bears W. $\frac{3}{8}$ S. $4\frac{1}{2}$ miles, and Quoin island peak N. $\frac{1}{8}$ W. $5\frac{1}{2}$ miles. Caution is necessary in the vicinity of this rock, as the soundings are very regular, from 24 to 27 fathoms, until close to the rock, thus giving little or no warning of the approach to it.

South-west rocks, a small cluster 22 feet high, composed of volcanic tuff, bear W. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles from the South extreme of Great Hanish, and have deep water all round.

The HAYCOCKS are three islets lying in a north-east and south-west direction, south-westward of the Hanish group, the north-east islet bearing S.W. by W. $\frac{1}{2}$ W. 4 miles from the Three-foot rock just described. The Middle Haycock is a symmetrical and conspicuous cone, 310 feet high, in lat. $13^{\circ} 32\frac{1}{4}'$ N., long. $42^{\circ} 36\frac{1}{2}'$ E., and bears S.S.W. $\frac{5}{8}$ W., $7\frac{1}{2}$ miles from the southern point of Great Hanish. From it, the N.E. Haycock, 144 feet high, bears E.N.E. 9 cables, and the S.W. Haycock 172 feet high, S.W. nearly the same distance.

MOHABBAKAH ISLANDS are a group of four islets lying southward of the Haycocks, High island, the nearest of the four, bearing S.S.W. $\frac{1}{2}$ W., $4\frac{1}{2}$ miles from the S.W. Haycock. High island, in lat.

See plan, No. 453.

13° 27' N., long. 42° 34' E., is rather less than 2 cables in length east and west, the eastern and highest end rising to a height of 69 feet.*

Flat island, S.W. $\frac{3}{4}$ S. $2\frac{3}{4}$ miles from High island, rises vertically from the water to a height of 40 feet; its surface is white and perfectly flat.

Harbi island, S.E. by E. $6\frac{1}{2}$ miles from Flat island, and E. by N. $\frac{1}{4}$ N., 5 miles from Sayal, is about 2 cables in length north and south; it is a similar white rocky island to Flat island, and about 82 feet high at its southern end.

Sayal island is a small rocky island, 50 feet high, $6\frac{3}{4}$ miles N. by E. $\frac{3}{4}$ E. from the summit of Ras Beilul, and 6 miles N. by E. from the extreme point.

All the islands between Great Hanish and Ras Beilul are surrounded by deep water, the depth close alongside exceeding 10 fathoms, and rapidly increasing. They are all more or less covered with bird lime, which gives them the white appearance described, and at times makes them difficult to distinguish.

Harbi and Sayal islands are about 60 miles distant from Perim island in the strait of Bab-el-Mandeb, and, from these islands southward to the strait, all shoals and islets are included in the descriptions of the neighbouring shores of the Red sea in the following chapters.

* With reference to the passage down the Red sea westward of Jebel Zukur and the Hanish islands, and between the Haycocks and Mohabbakah islands, mentioned at page 31, and which, in the event of a well-arranged system of lighting being established, may become the principal route, an examination by H.M. surveying ships *Rambler* and *Stork*, assisted by H.M.S. *Kingfisher*, in 1891, failed to discover any reason why it should not now be safely adopted as a daylight passage. The possibility of the existence of other small rocks, like the Avocet and Penguin rocks, so long undetected, makes it, however, desirable to avoid the edge of the bank bordering the deep gully in the centre of the sea, and a vessel should keep in this deeper water from Jebel Teir to the Mohabbakah islands. Having passed between S.W. Haycock and High island, a good berth should be given to the Scilla shoals.

See chart, No. 143.

Anchorage.—There is good shelter from southerly winds near the northern end of Jebel Zukur in 11 fathoms, sand and coral, with the southern end of Quoin island (Abu Ail) just open of North point, East; an ancient tomb near the beach S. by W. $\frac{1}{4}$ W.; and the highest peak of Jebel Zukur S. $\frac{7}{8}$ E. The tomb is a square building of naturally dark stone, but the sea face was whitewashed by the surveyors in 1881.

In this berth, a vessel lies $2\frac{1}{2}$ cables from the reef fringing the coast and opposite an opening through which boats may pass and lie securely inside; the opening, however, is narrow, and to avoid a dangerous rock on the eastern side, boats should keep as close as possible to the breakers on the western side.

Off the north-western shore generally, there is anchorage in from 7 to 10 fathoms close in, and in 23 fathoms 5 cables from the shore, but the bottom in this part is rocky.

There is also good anchorage in South bay, and that in its north-western part is better than the north-eastern. Here a vessel should anchor in about 8 fathoms, midway between Near island and the shore of Zukur eastward of it, with the northern end of Near island bearing N.W. by W. $\frac{3}{4}$ W. There are a few straggling huts on the shore, and some trees. Across the entrance of the bay, the soundings are from 30 to 36 fathoms, with an irregular decrease, there being 9 fathoms a short distance from the shore reef in the western bight, and 9, 13, and 15 fathoms in the eastern.

Water.—Good water may be obtained about $1\frac{1}{2}$ miles northward of the bay formed by Sandy Peak island, by digging a hole in the sand, which is black; it is, however, difficult to get it off in casks over the rugged reef with which the shore is lined.

Wood may also be had on the northern and southern parts of Jebel Zukur, and grass in some of the valleys, where antelopes are found. There are no constant residents on this island, but it is resorted to by fishermen from Kamaran and Makalla in search of various Red sea productions, amongst which are sharks' fins, salt fish, and turtle. The fishermen generally remain from February until May or June.

High island, 216 feet high and having a flat appearance, lies North from the northern end of Jebel Zukur; from which it is separated by a navigable channel half a mile wide and 19 fathoms deep. The island may be approached on all sides to the distance of a cable.

ABU AIL ISLANDS lie E. $\frac{1}{4}$ N. 3 miles from North point, Jebel Zukur; Quoin island, the westernmost, is 345 feet high, and from the northward makes as a pyramid; Pile island, the easternmost, is 237 feet high. They are of a whitish-brown colour, and are therefore not so easily seen at night as islands of a darker shade; they have a bold

and steep appearance, and are entirely destitute of vegetation. Landing may be effected on the eastern side of Quoin island, but with difficulty. Pile island is an inaccessible pile of rock. On the south-west side of Quoin island, at the distance of about $2\frac{1}{2}$ cables, there is a ledge of rocks 6 feet high with foul ground extending in an E.S.E. and W.N.W. direction for $2\frac{1}{2}$ cables. The narrow channel between the rocks and Quoin island has a depth of 13 fathoms but should not be attempted.

Abu Ail channel.—This channel between Quoin island and Jebel Zukur, is more than 2 miles wide at the narrowest part, and the mid-channel soundings are from 40 to 50 fathoms. Until the rocks lying off Quoin island are passed, vessels from the northward should keep on the Jebel Zukur side as the safest; but, having passed those rocks, East point, Jebel Zuku, should be given a good berth, both on account of the 15-foot rock off it, and of the tidal streams which are here very irregular and occasionally set across the channel. This should be specially observed at night or in hazy weather, when the high land of Jebel Zukur has a peculiar distant appearance, and East point, being low, with white sand behind, easily mistaken for water, is not seen until a vessel is dangerously close to it.

Tongue island, so called from its shape, is 166 feet high and more than 2 miles from the south-western end of Jebel Zukur, with a clear deep channel between them; it has on its southern side a low reef of rocks above water, the whole forming a circular basin about 3 cables in diameter. The depths in the basin are from 18 to 22 fathoms; boats can enter on the eastern side, through a passage having a depth of 10 feet.

LITTLE HANISH, about $1\frac{1}{4}$ miles southward of Jebel Zukur, and separated from it by a channel with from 30 to 40 fathoms water, is 627 feet high, 3 miles long, and $1\frac{1}{4}$ miles wide; it has a remarkable piece of land on the summit of the eastern end, which, when observed from Great Hanish, resembles a thumb or small peak in the act of falling, and is therefore named Tumble-down peak. The island is rugged, with grass in some parts. A few antelopes are found.

Off the north-eastern side of Little Hanish, about a mile distant, are some rocky islets connected with that part of Little Hanish by sunken rocks; the northern islet is 88 feet high. Off the eastern coast is a chain of islets about 2 miles long, and separated from Little Hanish by a navigable channel nearly half a mile wide. Low island, the largest of the chain, is 48 feet high, and off its eastern side, nearly a cable from the shore, is a rock 35 feet high; and, a cable and a half outside this, is the Fawn rock, nearly awash at low water.

A rocky 7-fathoms patch lies E. by S. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from Tumble-down peak, and $1\frac{1}{4}$ miles from the nearest part of Low island. Although 7 fathoms was the least water found during the survey, it is possible,

considering the nature of the ground, that shoaler water may exist. Vessels, therefore, should give Low island a wide berth.

Anchorage, in 16 fathoms, with good shelter from southerly winds, may be found in the channel between Little Hanish and Low island, with the southern part of Low island just open of its western point, and the little islet off its northern end bearing N.E. $\frac{3}{4}$ E. Another berth, farther south is in 17 fathoms, with the southern end of Low island bearing South, and the small islet off the northern end kept a little open.

GREAT HANISH, separated from Little Hanish by a channel nearly 3 miles wide with from 30 to 45 fathoms water, is 10 miles long N.E. and S.W., by about 3 miles wide at its broadest part. The highest part, 1,335 feet high, is near the centre, and, as seen from some directions, appears as a remarkable bluff. A strip of sand crosses the island at 3 miles from the southern end, and the land on either side being high, the southern part, from a distance, has the appearance of being a separate island. The south-western end of the island is steep to on its western side, having no bottom at 100 fathoms close in shore, in some places. There is a good deal of grass in the valleys and many antelopes.

Anchorage.—Along the eastern side of the island, outside the fringing reef, the soundings are tolerably regular, affording anchorage and good shelter in northerly winds. One of these anchorages is near the northern end of the island, from 6 to 8 cables from the shore, in from 7 to 12 fathoms, with Haycock island just open of the north-east point of Great Hanish; another is nearer the shore in about 11 fathoms, with North Round island bearing about E. by N., and the Chor rock S. $\frac{3}{4}$ W.; but the best anchorage is farther southward, in 16 fathoms, with Double-peak island bearing about S.E. There is also anchorage in South-east bay, at the southern end of Great Hanish.

The following are the smaller islets and rocks lying near Great Hanish—they are nearly all eastward or southward of the island except the South-west rocks, and the dangerous Marescaux rock now to be described.

Marescaux rock.—This rock, with only 6 feet water, lies $1\frac{1}{3}$ miles from the nearest shore off the north-western side of Great Hanish. The rock is of small extent, and the sea generally breaks on it, but the ground in the neighbourhood has not been examined, and the locality should be avoided. From it, the northern extremes of Peak island, 107 feet high, and of Great Hanish, are just in line.

Haycock island, 519 feet high, is separated from the north-eastern point of Great Hanish by a narrow channel having general depths of 9 or 10 fathoms; but nearly in mid-channel, though nearest to the

See plan, No. 453.

Haycock shore, there is a sunken rock having only 6 feet. The island resembles a haycock from the southward, but on passing close eastward of it, the inside appears to be hollowed out like a saucer.

Currents run strongly round Haycock island, and a whirl or eddy is seen off the coast of Great Hanish southward of the Haycock. There are also tide rips between the Haycock and Mushéjera.

Addar Ail.—This small group of rocky islets, the highest being 120 feet, is nearly a mile distant from the eastern side of the Haycock, and in the channel between them the depth is about 28 fathoms; they form a circular basin, $1\frac{1}{2}$ cables in diameter, with a small opening on its southern edge.

Mushéjera, a small islet bearing E. by S. $2\frac{3}{4}$ miles from the highest part of the Haycock, is about 24 feet high, and nearly a cable in length. On its southern and western sides it may be safely approached to a distance of 2 cables, but a dangerous reef extends 3 cables eastward and north-eastward of it, and the island being low is not easily seen at night. The passage between Mushéjera and Addar Ail is clear.

North Round island and Quoin island, 360 and 229 feet high respectively, and both named from their shape, are from $1\frac{1}{4}$ to 2 miles from the centre of the eastern side of Great Hanish, with a 20-fathoms channel between them and it. The channel between the two islands is also clear, and has a depth of 11 fathoms.

Chor rock.—At $2\frac{3}{4}$ miles S.W. by W. from North Round island, and 7 cables from the shore of Great Hanish, are some black rocks, the Chor rock, the highest, being 72 feet above water, with from 6 to 9 fathoms, rocky bottom, on their eastern side, and from 12 to 17 fathoms half a mile off in the same direction, increasing to 24 fathoms between them and the Round islands, whilst between the Chor rock and the shore is a channel with from 7 to 9 fathoms.

SUYUL-HANISH ISLANDS, three in number, and connected by a reef, together occupy a space nearly $3\frac{1}{2}$ miles long N.N.E. $\frac{3}{4}$ E. and S.S.W. $\frac{3}{4}$ W., and their south-western end is about 3 miles from the south-eastern part of Great Hanish; their northern end is less than $1\frac{3}{4}$ miles from that island, between which and them is a navigable channel with the Pin and Cust rocks in the middle of its southern entrance, and the Chor rock in its northern. The islands are of considerable height: Double-peak island, the northernmost, is 446 feet high and very steep, with two small peaks close together; Suyul-Hanish, the southernmost and largest, is 2 miles long, one mile wide at its southern end, 381 feet high, and very rugged. Temporary anchorage may be found on its eastern

side. Mid island, circular in shape and about 2 cables in diameter lies between the two islands.

Pin rock, 12 feet high, lies nearly midway between the southern points of Great Hanish and Suyul-Hanish, and may be approached closely, except on the western side, where the Cust rock, a sunken rock, lies W.N.W. about 7 cables from the Pin. There is deep water between the latter and the Cust rock.

Ship and Three-foot rocks.—The Ship rock, a dangerous sunken rock with 6 feet water, lies S.W. by W. from the peak of Suyul-Hanish, and about $8\frac{1}{2}$ cables from the nearest part of that island. The Three-foot rock, a small rock of fine vesicular lava, standing 3 feet above the water, is situated S.W. $\frac{3}{4}$ W. from Suyul-Hanish peak, and $2\frac{1}{2}$ miles from the nearest part of that island; it lies $1\frac{1}{2}$ miles outside the Ship rock, and has deep water close-to.

South Round island and Rocky islands.—Eastward of Double-peak island, $2\frac{1}{4}$ miles distant, is South Round island, 87 feet high and dark in appearance; and $1\frac{1}{4}$ miles south-westward of South Round island are the Rocky islands, consisting of black rugged rocks, the highest 55 feet above the sea.

The Parkin rock, a small rock 11 feet high and nearly $2\frac{1}{2}$ miles S. by E. from South Round island, is the south-eastern rock of the Hanish group. From it, Suyul-Hanish peak bears W. $\frac{3}{8}$ S. $4\frac{1}{2}$ miles, and Quoin island peak N. $\frac{1}{8}$ W. $5\frac{1}{2}$ miles. Caution is necessary in the vicinity of this rock, as the soundings are very regular, from 24 to 27 fathoms, until close to the rock, thus giving little or no warning of the approach to it.

South-west rocks, a small cluster 22 feet high, composed of volcanic tuff, bear W. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles from the South extreme of Great Hanish, and have deep water all round.

The HAYCOCKS are three islets lying in a north-east and south-west direction, south-westward of the Hanish group, the north-east islet bearing S.W. by W. $\frac{1}{2}$ W. 4 miles from the Three-foot rock just described. The Middle Haycock is a symmetrical and conspicuous cone, 310 feet high, in lat. $13^{\circ} 32\frac{1}{4}'$ N., long. $42^{\circ} 36\frac{1}{4}'$ E., and bears S.S.W. $\frac{5}{8}$ W., $7\frac{1}{2}$ miles from the southern point of Great Hanish. From it, the N.E. Haycock, 141 feet high, bears E.N.E. 9 cables, and the S.W. Haycock 172 feet high, S.W. nearly the same distance.

MOHABBAKAH ISLANDS are a group of four islets lying southward of the Haycocks, High island, the nearest of the four, bearing S.S.W. $\frac{1}{2}$ W., $4\frac{1}{4}$ miles from the S.W. Haycock. High island, in lat.

13° 27' N., long. 42° 34' E., is rather less than 2 cables in length east and west, the eastern and highest end rising to a height of 69 feet.*

Flat island, S.W. $\frac{3}{4}$ S. 2 $\frac{3}{4}$ miles from High island, rises vertically from the water to a height of 40 feet; its surface is white and perfectly flat.

Harbi island, S.E. by E. 6 $\frac{1}{2}$ miles from Flat island, and E. by N. $\frac{1}{4}$ N., 5 miles from Sayal, is about 2 cables in length north and south; it is a similar white rocky island to Flat island, and about 82 feet high at its southern end.

Sayal island is a small rocky island, 50 feet high, 6 $\frac{3}{4}$ miles N. by E. $\frac{3}{4}$ E. from the summit of Ras Beilul, and 6 miles N. by E. from the extreme point.

All the islands between Great Hanish and Ras Beilul are surrounded by deep water, the depth close alongside exceeding 10 fathoms, and rapidly increasing. They are all more or less covered with bird lime, which gives them the white appearance described, and at times makes them difficult to distinguish.

Harbi and Sayal islands are about 60 miles distant from Perim island in the strait of Bab-el-Mandeb, and, from these islands southward to the strait, all shoals and islets are included in the descriptions of the neighbouring shores of the Red sea in the following chapters.

* With reference to the passage down the Red sea westward of Jebel Zukur and the Hanish islands, and between the Haycocks and Mohabbakah islands, mentioned at page 31, and which, in the event of a well-arranged system of lighting being established, may become the principal route, an examination by H.M. surveying ships *Rambler* and *Stork*, assisted by H.M.S. *Kingfisher*, in 1891, failed to discover any reason why it should not now be safely adopted as a daylight passage. The possibility of the existence of other small rocks, like the *Avocet* and *Penguin* rocks, so long undetected, makes it, however, desirable to avoid the edge of the bank bordering the deep gully in the centre of the sea, and a vessel should keep in this deeper water from Jebel Teir to the Mohabbakah islands. Having passed between S.W. Haycock and High island, a good berth should be given to the Scilla shoals.

See chart, No. 143.

CHAPTER III.

GULF OF SUEZ AND STRAIT OF JUBAL.

(Lat. 29° 58' N. to lat. 27° 10' N.)

VARIATION IN 1900.

Suez - - - 3° 50' W. | Shadwán Island - 3° 40' W.

General Remarks.—From the town of Suez to the southern point of Shadwán island, the gulf of Suez is 172 miles long in a S.S.E. direction; and, southward of Suez bay, it varies in width from 10 to 25 miles. The narrowest part of the navigable water southward of Ras Mesalle is in the strait of Jubal, between Shab Ali on the eastern, and the Ashrafi shoals and Shab Jubal on the western side; here it is only $6\frac{1}{2}$ miles wide. At Ras Metarma and at the Sheratíb shoals it is about $7\frac{1}{2}$ miles wide. The shores are bordered by high land, in many places approaching close to the sea, and often affording conspicuous landmarks; and on either side they are fringed throughout their whole length by coral reefs, which, on the eastern side more particularly, extend a considerable distance to seaward. On the western side, the coast reef does not generally reach so far seaward as on the eastern, and the shore may therefore be approached with more confidence. In the strait of Jubal, and in the gulf generally, there are outlying patches to be avoided, all of which are fully described in the present chapter.

Winds.—In the gulf of Suez, northerly winds prevail nearly all the year round; the wind is generally lightest near the western shore, especially in the neighbourhood of high land. With a strong north-westerly wind in the gulf, it is usually calm in the bay southward of Jebel Atakah. At Suez, the northerly wind usually freshens up late in the afternoon and continues until midnight. By getting under way in the evening, a ship will reach the continuous winds to the southward without experiencing a calm. See Appendix, page 478.

Anchorage.—There are many convenient anchorages in the gulf of Suez, which are found useful by sailing vessels and steamships of small power obliged to anchor through stress of weather; but, as they are all in close proximity to reefs, some care is required in approaching them, adopting the precaution, so often mentioned, of sailing or steaming with

See chart, No. 757.

the sun astern of the vessel, and keeping a look-out from the mast-head. The best anchorages, named in the foot-note at page 30, are described at their proper places in this chapter. When anchoring with a north-westerly wind, it is advisable not to hug the shore too closely in case of a shift of wind, which is often very sudden and unexpected.

Tidal Streams.—Notwithstanding the difference between the times of high water at the full and change at Suez and Ashrafi, the tidal stream runs to the northward throughout the whole length of the gulf of Suez when the tide is rising at Suez, and when falling, to the southward; both streams set fairly in mid-channel, with a maximum rate of $1\frac{1}{2}$ knots an hour at springs, and half a knot at neaps, except near Ras Abu-deraj, Sheratib shoals, Ashrafi islands, &c., where the direction is uncertain. In the strait of Jubal, the strength of the stream is increased to from $1\frac{1}{2}$ to 2 miles an hour, and here it runs longer to the northward than to the southward; nearer the reefs the direction is uncertain. Northward of Tor, high water occurs almost simultaneously with Suez; and, in the southern part of the gulf, it is low water when it is high water at Suez, and *vice versa*; see also page 18.

SUEZ BAY is at the northern end of the gulf of Suez; and, for present purposes, we shall consider Ras el Adabieh its southern boundary on the western side, and Ras Mesalle on the eastern side. The distance between these two points is nearly 6 miles in a S.E. by E. direction, and the length of the bay, from the town of Suez to Ras el Adabieh, $6\frac{1}{2}$ miles in a S.S.W. $\frac{1}{4}$ W. direction.

The shores of the bay are skirted by reefs and shoal water, and are low and sandy, except on the western and south-western sides, where the Atakah mountains touch the coast. On the northern side is the desert; and, on the eastern side, the low coast rises very gradually to hills of moderate height in the interior. The general depths in Suez bay are from 9 and 10 fathoms in the middle to a few feet near the shore.

Caution.—Vessels should not approach the shores of Suez bay without a chart or a good pilot, on account of the numerous coral patches which exist, and especially in the vicinity of Ayun Musa (the wells of Moses), which are conspicuously marked by palm trees, and off which vessels in quarantine occasionally anchor; also off Ras Mesalle, the low point southward of the wells; and in the bight on the western shore under the stone quarries in the slope of Atakah.

Town.—At the head of the gulf stands the town of Suez, which became an important place when the route to India through Egypt was established; the opening of the Canal, however, considerably reduced its importance, and for some years the town as well as the wet docks of port Ibrahim, created at a great expense, have been gradually decreasing in

importance and falling into a state of decay. Suez has always been the seat of a considerable transit trade, the ancient cities Arsinoe and Kolzum having stood in the neighbourhood.

The town stands on a spit of the desert projecting eastward, with the bay of Suez on its southern side and Suez creek on its northern side. There is a large government house with a conspicuous dome and many well built stone houses. A British vice-consul is stationed at Suez, and almost every nation is represented by Consuls or consular agents, and nearly every vessel entering the canal is boarded by an agent in a steam launch. There are two hospitals, one French the other Arab. Between 6 h. a.m. and 9 h. p.m. there is a half-hourly train between the town and port Ibrahim, and a train twice a day to Cairo and Alexandria.

The Khedive's kiosk stands on higher ground at the back of the town and is remarkable from the sea, as is also the large house, formerly the Suez hotel, which is the easternmost building in the place, but no longer exists as an hotel.

Trade.—In the year 1898, there were duly registered, at the respective Consulates, as having entered the port of Suez, 252 vessels with an aggregate of 461,402 tons. The exports are corn, pulse, and manufactured goods dyed in Egypt. The imports are coffee, spices, dyes, carpets, gunny bags, and various products of Arabia, India, and China. The average annual value of imports and exports exclusive of transit is about £726,000. Special customs and quarantine regulations were framed in 1884, after consultation with and by consent of most foreign governments.

Population.—According to the census taken by the Egyptian authorities during 1897 the population of the town of Suez is given at 18,274, but besides this number there are 6,696 Bedouins living in the environs, thus forming a total of 24,970 classified as follows:—Egyptians, 22,196; Greeks, 1,000; British, 641; Italians, 506; French, 270; Austrians, 265; Russians, 51; Germans, 10; others, 31. In addition numerous pilgrims and travellers continually pass through on their way to Mecca; in the year 1898 the pilgrim traffic amounted to 16,895.

Quarantine.—No vessel is allowed to enter the canal from the southward without a medical inspection by the sanitary authorities at Suez, for which purpose it is necessary that all ships from the southward should anchor. *See page 89.*

Homeward-bound passenger vessels are free to transit the canal in quarantine without communicating with the shore; and most of the large mail steamers have begun to do so (*see page 47*).

Telegraph.—From Suez, telegrams can be sent by Egyptian telegraph to the interior; and by the Eastern telegraph company to England *via* Malta, and to Sawákin, Jidda, Massawa, Asab, Perim, Obokh,

Aden, Bombay, &c., by submarine cable through the Red sea and Arabian gulf; see telegraph cables, page 5. The telegraph cable house is on the shore, about a quarter of a mile westward of the town.

Port Ibrahim.—Docks.—The wet docks or North and South basins which form the port of Suez are named port Ibrahim. The depth of water in the North basin varies from 23 to 27 feet, and in the South from 20 to 22½ feet. Vessels drawing 23 feet can be berthed alongside the quays in the North basin, and those of 22 feet in the South basin, except where dangerous on account of the defective state of the walls. The line of railway to Cairo and Alexandria is carried alongside the central wharf, which divides the two basins, but from the ruinous state of the walls it is not safe for vessels to moor alongside.*

Occasional harbour lights.—Vessels desiring to enter port Ibrahim at night should apply to the Port office, when the following lights will be specially lighted for them:—

1. A *fixed red* light at the extreme of the North mole-head; a *fixed green* light at the extreme of the South mole-head.
2. A *fixed white* light at the inner (or central) pier-head. This light will not show until it bears eastward of N.E. ½ N.

Buoys.—Two large can buoys with rails round the top, painted black, are moored 879 yards seaward of the entrance of the port; on the north side of the fairway at 568 yards from the mole-head, there is an additional buoy.

Entering Port Ibrahim—the vessel should be steered for the *white* light on the inner or central pier-head showing midway between the *red* and *green* lights bearing N.E. by E. ¼ E., which leads between the outer pair of buoys and into the harbour.

The Dry Dock, called the Ismail dock, at the head of the South basin of port Ibrahim, is 406 feet long over all, by 73½ feet wide at entrance, and can dock a ship 400 feet in length, drawing 23 feet water. A length of 406 feet on blocks can be obtained if necessary. There are 28½ feet water over the sill, and from 22½ to 26½ feet water on the blocks, at high water, ordinary springs. In winter, two feet greater depth may sometimes be obtained. The depth in the channel leading to the dock does not exceed 24 feet. In connection with the dock is a floating steam crane capable of lifting 20 tons, and a government workshop where ordinary repairs can be made good, but from the scarcity of workmen and material, heavy repairs could not be undertaken without the assistance of the Canal Company.

* Information on wet docks by Morice Pasha, March 1890.
See plan, No. 734.

Coal and Supplies.—There are generally from 6,000 to 7,000 tons of coal in stock, the price averaging about 26s. to 29s. per ton. Vessels coal 20 to 30 feet from the wharf, where the walls are safe, in 21 to 25 feet at low water, spring tides; or from lighters in the roads, where the weather rarely impedes coaling except when a gale or strong southerly wind sets in. Provisions are plentiful and good; and, in the proper seasons, various fruits as well as fine vegetables may be procured, there being large and productive gardens in the immediate neighbourhood of the town.

The SUEZ CANAL.—Between the south-eastern side of port Ibrahim and Kad-el-Marakeb point is the entrance to the Suez canal, at port Thewfik, as fully described in the preceding chapter. The offices of the Company, with the signal and pilot station are conveniently situated near the inner end of the gare on the north-western bank. Directions for its navigation, with the official regulations, having been already given, it is only necessary here to remind vessels arriving in Suez bay from the southward, that all those over 100 tons, gross, navigating the Canal must take a pilot, and that no vessel is permitted to enter without a medical inspection by the sanitary authorities at Suez (for which it is necessary a ship should anchor,) and until after first communicating with the Company's officials. No pilot will come on board before the medical inspection takes place, and if pratique is not given the pilot will conduct the ship by going ahead of her in a steam launch.

Fresh-water Canal.—Suez is connected with the river Nile by means of a fresh-water canal, which supplies the town. It follows nearly the line of railway from Ismailia to Suez, and was completed in the year 1863. At port Ibrahim, water is obtained by means of a pipe led from the canal, and it can be brought alongside a ship in steam-tanks, if required.

Suez Creek.—On the western side of the Maritime canal, about one mile within the entrance, is the southern end of Suez creek, a tidal channel leading up to the town of Suez, the town being on low land on the western side of the creek. At low water, springs, this channel commands only 4 feet water, with a breadth of 100 yards, and has extensive dry sand-banks on either side.

Harbour light.—To assist small craft in navigating this creek at night, a small *fixed white* light is shown, at about 20 feet above the sea, from an open iron lighthouse erected on the southern end of the Middle sand in $3\frac{1}{2}$ feet at low water; it is visible at the distance of 5 miles in clear weather, and bears N.W. one cable from the jetty-head near the old quarantine station, and about N.E. $1\frac{1}{2}$ cables from the triangular black beacon, 15 feet high, marking the western side of the channel at the Middle bend.

Boats going up the creek should leave the light on the starboard hand, and the beacon on the port hand.

See plan, No. 734.

Kad-el-Marakeb.—Light-buoy.—Kad-el-Marakeb, forming the south-eastern boundary of Suez roadstead, is a low sandy point covered at high water. At low water, about three-quarters of a mile of sand uncovers in a westerly direction. About 100 feet westward of the extreme of the spit, in $5\frac{1}{2}$ fathoms water, is a red light-buoy showing a *fixed green* light visible at least 2 miles. There is a patch of rocks, dry at low water, S.W. 8 cables from Kad-el-Marakeb.

Close to Kad-el-Marakeb is the Canal breakwater, about 5 cables long in a W.N.W. and E.S.E. direction.

Kal-ah-Kebireh shoal, in the middle of Suez roadstead, of coral, uncovers about 2 feet at low water, and is about $4\frac{1}{2}$ cables long N.N.W. and S.S.E. by about 3 cables wide; near its northern and southern ends are blocks of stone visible at low water. Many of the outlying rocks of the reef are marked by iron poles which are about 2 feet above the water at high tide.

There are several shallow patches of from 2 to $2\frac{1}{2}$ fathoms in the vicinity of Kal-ah-Kebireh; the outer ones lie N.W. by W. $4\frac{1}{2}$ cables, and N. by E. $\frac{1}{2}$ E. 6 cables from the lighthouse on the shoal.

Ships of heavy draught will find a deep channel westward of Kal-ah-Kebireh shoal.

LIGHT.—A lighthouse of open ironwork on masonry base stands near the centre of Kal-ah-Kebireh shoal, from which is exhibited *two fixed red* lights vertically, at the height respectively of 55 and 43 feet above high water, and visible from a distance of about 2 miles. These lights are for the convenience of vessels manœuvring in Suez bay.

SUEZ ROADSTEAD.—The anchorage in the northern part of Suez bay is well sheltered from all but southerly winds, which frequently blow home accompanied by a heavy sea. Vessels should not bring the entrance to port Ibrahim eastward of E.N.E. when anchoring, as the holding ground then becomes bad. A good berth is in $5\frac{1}{2}$ or 5 fathoms, with Kal-ah-Kebireh lighthouse bearing S.W., and the outer extreme of the Canal breakwater E. $\frac{1}{2}$ S. The bottom here is stiff clay and excellent holding ground.

Anchorage may also be obtained off port Ibrahim, and off the entrance of the Canal, in not less than 22 feet, with the Lazaretto at the southern angle of the South basin, between the bearings N.E. by E. and E. $\frac{1}{2}$ S.

Tides.—It is high water, full and change, in Suez bay at 11 h.; springs rise 7 feet, neaps 4 feet. After a continuance of southerly winds for two or three days, the water will sometimes rise 8 or 9 feet.

Newport rock is, in fact, a very small knoll of soft mud, in which no rock or coral has been found until a boring of 13 feet has been made

through the mud. It has a least depth of 13 feet at low water, and lies S.S.E. $\frac{3}{4}$ E. nearly 2 miles from Kal-ah-Kebireh lighthouse.

LIGHT.—From a cylindrical lighthouse rising from the centre of the keeper's dwelling on a screw-pile iron structure on the centre of Newport rock, is exhibited at the elevation of 43 feet above high water, a *revolving white* light with a period of *thirty seconds* visible in clear weather from a distance of 12 miles. The lantern and roof of dwelling is painted pink, dwelling itself white, piles black.

Fog signal.—During thick or foggy weather, a bell will be struck at this lighthouse *once every thirty seconds*.

Shoal.—A small patch of 4 fathoms has recently (1899) been discovered at the entrance to Suez bay, from which Newport rock lighthouse bears N. 15° W., distant $1\frac{6}{10}$ miles, and the solitary palm tree at Ayun Musa, N. 88° E.

Directions.—Having cleared the canal entrance, or weighed from Suez bay, a ship should pass between the Kal-ah-Kebireh shoal, marked by the lighthouse, and the spit light-buoy off Kad-el-Marakeb, about 3 cables from the latter; then, steering South the Newport rock lighthouse should be passed at the distance of about $1\frac{1}{2}$ cables on the port hand. The same course for another mile leads in the channel of deepest water past Ras el Adabieh; from thence, a S. $\frac{3}{4}$ W. course if continued for 17 miles clears the low and dangerous points, Mesalle and Sudr, on the eastern side of the gulf, when a fairway course S. by E. $\frac{3}{4}$ E. may be steered.

Approaching from the southward, the eastern slope of Jebel Atakah bearing N. by W. $\frac{1}{2}$ W., leads clear of the shoal water on the eastern side of the gulf. When Newport rock light is seen it may be steered for on a N. $\frac{3}{4}$ E. bearing, and be passed on its west side at the distance of $1\frac{1}{2}$ cables, whence a N. $\frac{1}{2}$ W. course will lead between Kal-ah-Kebireh and the Spit light-buoy off Kad-el-Marakeb.

To ensure clearing the reefs off Ras Mesalle on a dark or misty night, the safest course is to steer North into the bay southward of Ras el Adabieh and skirt round the western shore, keeping outside the 20-fathoms line of soundings, about 2 or 3 miles from the shore. This will lead up until the Newport rock light is sighted.

Jebel Atakah is a remarkable range of mountains on the western side of Suez bay, rising to a height of 1,800 feet, nearly abreast of Ras el Adabieh, where they slope to the eastward and form a good landmark.

Ras el Adabieh, a low sandy spit about 6 cables long in a N.E. by N. direction, is on the south-western side of Suez bay, about 3 miles eastward of the highest part of the Atakah mountains, and is

marked near its extreme by a low stone hut. Shoal water extends from it towards the Newport rock; that is, in an E.N.E. direction. Eastward of this, the water deepens gradually to 24 feet, and, 2 miles distant from the point, leaves a narrow channel of 6 and 7 fathoms depth, one cable wide, between the bank and the Newport rock.

Adabieh bay.—On the north-western side of the Ras is Adabieh bay, forming, when clear of the shoal water extending from the point, a fine, clear, and almost land-locked harbour, admirably suited for a quarantine station, with anchorage in from $4\frac{1}{2}$ to 7 and 8 fathoms. The Atakah reef lies in the centre of the entrance, and the Mensiya reef at the edge of the shore reef. The shore of the bay is steep-to for boats to land, and communication with Port Ibrahim or the Canal is easy under canvas, the prevailing wind during the greater part of the year being a leading wind both ways.

Immediately southward of the house on the spit Ras el Adabieh, and for 6 miles along shore to the south-westward, the navigable water extends to within half a mile of the beach.

Ras Mesalle, the south-eastern extreme of the bay of Suez, is low, sandy, and skirted by a reef which extends W.N.W. about 8 cables. Shoal patches lie off this point, distant $1\frac{1}{2}$ miles and $2\frac{1}{4}$ miles nearly. The Conry rock, the outer patch of 4 fathoms, lies W. by S. $\frac{3}{4}$ S. from the point; the inner patch of $3\frac{3}{4}$ fathoms is nearly on the same line. In passing, do not shoal to less than 20 fathoms.

Anchorage.—At $1\frac{1}{4}$ miles southward of Ras Mesalle is Kad-el-Towila, a coral reef extending $1\frac{1}{2}$ miles from the shore and covered at low water, with deep water close to its western extreme; vessels may anchor between the reef and Ras Mesalle in about 4 fathoms, sand, with the Ras bearing N. by W. 5 or 6 cables.

WEST COAST.—From Ras el Adabieh the coast has a general S.W. by S. direction for about 19 miles, when it turns to S.E. by S. for about 15 miles, forming a deep bay, nearly in the centre of which, at about 2 miles from the shore, are the Strickland shoal and Harris rock, two rocky patches about 4 miles apart, which should be avoided.

Soundings.—A glance at the chart shows that the 20-fathoms contour-line of soundings is a safe though close guide for a sailing ship working to windward at night between Ras Abu-deraj and Ras Mesalle, as, with the exception of the coast at the foot of the Abu-deraj mountains where the navigable water extends to within a cable of the shore, that depth will be carried until within half a mile of any danger. The eastern extreme of the Atakah mountains bearing N. by E. $\frac{1}{2}$ E. leads clear of the shoal patches on the western side of the gulf.

The western shore is the best to work to windward upon. When within 6 or 7 miles of Ras el Adabieh, a vessel may stand close over to the shore, as the navigable water extends to within half a mile of the beach.

Ras Abu-deraj.—From the entrance of Suez bay, the mountains of Abu-deraj, 4,250 feet high, on the western side of the gulf, are visible, the northern part of the range being shut in behind the Atakah range. The eastern spur of the Abu-deraj mountains slopes to the eastward and forms Ras Abu-deraj.

Abu-deraj reef.—From Ras Abu-deraj, the coast reef continues for many miles skirting the shore. Nearly 3 miles southward of the Ras, it extends seaward in the form of a rocky spit about 8 cables from the beach, and is at that part called Abu-deraj reef. Zafarana light bearing South leads $1\frac{1}{2}$ miles outside the danger, which is just within the range of the light.

From Ras Abu-deraj, the coast takes a S. by E. direction to Zafarana point, and is skirted by a coral reef extending from 5 to 8 cables from the shore, except in the vicinity of the latter point, where, as Zafarana reef, it extends $1\frac{3}{4}$ miles in a south-easterly direction from the lighthouse. In the space between Ras Abu-deraj and Zafarana point, the ground rises gradually to higher land in the interior, and is of a sandy appearance.

ZAFARANA POINT, 47 miles S. $\frac{1}{8}$ E. from Newport rock lighthouse, is low and flat. W.N.W. $4\frac{1}{4}$ miles from the point, there is a conspicuous black peak 270 feet high.

LIGHT.*—Near the extreme of Zafarana point stands the lighthouse, a white circular stone tower 83 feet above high water; it exhibits a *fixed white* light, visible in clear weather at a distance of 14 miles. Behind the lighthouse stands the keeper's dwelling house, a low, white, flat-roofed building. See view on chart.

Anchorage.—**Zafarana reef**, the projecting part of the coast reef before mentioned, extends from the lighthouse $1\frac{3}{4}$ miles in a south-easterly direction; whilst southward of the lighthouse, the land trends a little westward of South, forming a bay where anchorage may be found in several parts, but the most convenient is under the lee of the point reef, in about 5 fathoms, sand and coral, with the lighthouse bearing N.N.W. $\frac{1}{2}$ W., distant $1\frac{3}{4}$ miles.

EAST COAST.—On this side of the gulf, the coast reef extends farther seaward than on the western side, and the outlying patches are more numerous. See Caution at page 37.

* Owing to the effects of refraction, this and other lights in the gulf of Suez are visible, at times, at distances considerably greater than those stated in this work.

See chart, No. 757.

Ras Sudr and Ras Metarma, on the eastern side, 14 and 23 miles respectively from Ras Mesalle, are each low, sandy, and skirted by the coast reef, which extends from half a mile to a mile from the shore. The eastern slope of the Atakah mountains, bearing N. by W. $\frac{1}{2}$ W. leads about 2 miles clear of the shoal water off these points, but, as this is a distant mark, great care is required in obtaining a correct bearing. Indifferent anchorage may be obtained southward of both these points.

Kad Mallap.—Ras Mallap, 18 miles S.S.E. $\frac{3}{4}$ E. from Ras Metarma, is a low sandy point, between which and Ras Legyah, $3\frac{1}{4}$ miles to the north-westward, extends Kad Mallap, a coral shoal reaching to seaward $1\frac{1}{2}$ miles from the nearest part of the coast. Between Kad Mallap and Zafarana reef the navigable channel is 11 miles wide.

Anchorage.—On the southern side of Ras Mallap, between it and Jebel Hammam Firaun, temporary anchorage with protection from north-westerly winds may be found in from 11 to 12 fathoms, with Ras Mallap bearing N.W. $\frac{1}{4}$ N. 3 cables, and Hammam bluff E.S.E. $1\frac{3}{4}$ miles; but essels should be prepared to leave immediately in the event of a shift of wind.

Mountains.—On the eastern shore of the gulf of Suez, in a break in the apparently flat table-topped range of the Tih mountains, which extend far into the interior of the Sinai peninsula, is Jebel Bishr or Barn hill, a white clifly hill 2,050 feet high, and standing conspicuously by itself 20 miles S.E. by E. $\frac{1}{4}$ E. from Ras Mesalle.* Jebel Hammam Firaun is a range 29 miles southward of Barn hill, whose north-western bluff, when seen from the northward, is very conspicuous and shows as a precipitous cliff 1,620 feet high, very near the beach, and is one of the best marks on the eastern shore of the gulf, (*see* views on chart). The eastern side slopes gradually inshore. There is a hot salt spring and two hot caverns near the foot of the cliff. Farther southward on the Hammam range is Jebel Useit, 1,670 feet high, and the highest peak of the range.

From Barn hill to within a few miles immediately northward of Jebel Hammam Firaun, the hills on the eastern side of the gulf recede from the low coast, and, having no prominent features, are useless for landmarks. The lower range of white gravel-coloured Leygah hills skirting the shore just northward of Hammam Firaun are remarkable.

WEST COAST.—From Zafarana point to Ras Gharib the coast is composed of undulating desert plains rising gradually to the bases of the mountains, which, with the exception of Jebel Thlemaal, are from 15 to 20 miles inland. Ras Gharib lighthouse is $51\frac{1}{2}$ miles S.S.E. from Zafarana

* In Wadi Sudr, southward of this hill, Messrs. Palmer, Gill, and Charrington were treacherously murdered in 1882, during the Arabi rebellion in Egypt.

See chart, No. 757.

lighthouse, the coast in the intermediate space being without any prominent points, though slightly indented, but not in any part receding more than $5\frac{1}{2}$ miles from an imaginary line connecting the two lighthouses.

Mountains.—South-westward of Zafarana lighthouse, and 16 miles distant, the high table-lands of Abu Regim and Jebel Zafarana rise to the height of 4,750 feet. The north-eastern end of their summit is conspicuously marked by a nipple-shaped hill rising out of the range at a slightly less altitude. Jebel Thlemal, 8 miles S.W. from Zafarana lighthouse, and 3 miles inland, is 2,175 feet high, has four knobs on it, and is one of the most useful landmarks in this part of the gulf.

Jebel Ruahmi, in lat. $28^{\circ} 30' N.$, long. $32^{\circ} 34' E.$, and 16 miles from the nearest part of the coast, is a rugged-topped hill with a sharp conical peak at its southern end, 3,575 in height, which forms a good and conspicuous mark.

Jebel Gharib, in lat. $28^{\circ} 6\frac{1}{2}' N.$, long. $32^{\circ} 54' E.$, and 16 miles from the nearest part of the shore, is 5,740 feet high, a solitary and precipitous peak of a beautiful form. This mountain can almost always be seen at night, and is a most useful mark for ships running up and down the gulf.

Soundings.—Between Zafarana point and Ras Gharib the 20-fathoms contour-line of soundings does not approach the western shore in any part within a mile, except about 7 or 8 miles northward of Ras Gharib, where it is about 8 cables off-shore. A reef fringes the shore the whole distance between Zafarana point and Ras Gharib, but does not stretch seaward more than half a mile at any part, except in the vicinity of Zafarana lighthouse, as already mentioned. In the fairway, from 32 to 37 fathoms will be found, but a ship certain of her distance from the western shore may approach to within $1\frac{1}{2}$ miles of it.

Anchorage.—Ras Abu Baka, 15 miles N.W. by N. from Ras Gharib, forms the eastern extreme of a bay in which good anchorage may be found in from 6 to 8 fathoms, with protection from southerly winds; from the anchorage, Jebel Jehan, on the eastern shore, bears E. by S. $\frac{1}{8}$ S. 20 or 21 miles distant.

RAS GHARIB LIGHT.—Ras Gharib is a prominent point on the western shore at the foot of a low white-faced range of gravel hills. About 100 yards distant from the beach, in lat $28^{\circ} 21' N.$, long. $33^{\circ} 6\frac{1}{2}' E.$, stands the lighthouse, an iron cylinder 180 feet high, with three supporting stays, the whole painted red, and exhibiting, at an elevation of 165 feet above the sea, a *fixed white* light, visible in clear weather at the distance of 20 miles. At the base of the lighthouse is the keeper's dwelling, a circular building painted white; *see* view on chart.

See chart, No. 757.

A reef extends half a mile south-eastward from the lighthouse, and an iron pile jetty, 180 feet long, extends from the shore near the lighthouse; there are $4\frac{1}{2}$ feet water at its head at high water springs, the rise then being about 18 inches: boats can nearly always go alongside. This jetty is to be lengthened 110 feet. Ras Gharib has communication by camel with Suez once a fortnight; the journey occupies four days.

Anchorage.—There is tolerably well-sheltered anchorage in 4 or 5 fathoms southward of the reef, but the flood tide is strong and ships do not usually swing to a northerly wind. A heavy swell sets round the point.

EAST COAST.—Mountains.—On the eastern shore, southward of Jebel Hammam Firaun and Jebel Useit, the broken-up white coast hills gradually decrease in height until, at 16 miles south-eastward of the latter, close to a wadi, or valley, they end westward of an outlying spur of the dark granite range of Jebel Sumra. About 11 miles farther southward, the light-coloured hills again rise, and, gradually increasing in height and becoming more and more covered with sand, join the Jehan granite coast range, of which Jebel Jehan, 1,420 feet high, is the northernmost peak. At Ras Sheratib the break in the light-coloured hills, showing prominently against the dark range at the back, forms a good mark for ascertaining the ship's position.

From the neighbourhood of Zafarana, on the West coast, the lofty and massive mountain, Jebel Serhal, 6,680 feet high, and the more distant sugar-loaf peak Umm Shomer, 8,530 feet high (one of the Sinai range, and nearly 80 miles south-eastward from Zafarana), are seen rising high above the East coast hills. When a little farther southward, the dark Jehan and Húswah range, on the eastern coast, have the appearance of an island.

Soundings.—Southward of Kad Mallap shoal and as far as Ras Sheratib, the coast is fringed by a reef extending seaward from 2 to 8 cables in some places. With the exception of a small part near Jebel Useit, the 20-fathoms contour-line of soundings does not approach the coast reef within $1\frac{1}{4}$ miles.

Anchorage.—Ras Abu Zenima, 11 miles south-eastward of Jebel Hammam Firaun, is a low gravel point, having shoal water extending from it three-quarters of a mile in a southerly direction. The small bay, commencing about a mile eastward of Ras Abu Zenima, is one of the best sheltered anchorages on the eastern side of the gulf. A sheikh's tomb is erected on the southern side of the point. The camel track from Mount Sinai and Tor to Suez passes close to the shore in this vicinity. The gulf is 23 miles wide at this part.

There is no other anchorage on this shore between that just described and Tor harbour, 57 miles farther south-eastward, except a very indifferent one 4 miles northward of that port.

Ras Sheratib is a low sandy point on the eastern side of the gulf, in lat. $28^{\circ} 40' N$. In this locality the hills are 2 or 3 miles distant from the shore.

SHERATIB SHOALS are a narrow ridge of rocks with from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms water, about $3\frac{1}{2}$ miles long in an E.S.E. and W.N.W. direction; their western extreme bears S.W. $\frac{1}{2}$ W. $6\frac{1}{2}$ miles from Ras Sheratib, and S.S.E. $\frac{3}{4}$ E. 39 miles from Zafarana lighthouse; they narrow the navigable channel down the gulf at this part to $7\frac{1}{2}$ miles. A strong tide race runs over the ridge even in calm weather.

Clearing Marks.—The Ass's Ears or Jebel Abu Durba, a remarkable double boulder rock on the Jehan range, $2\frac{1}{2}$ miles southward of the peak, on with the summit of Jebel Húswah, the highest hill on the coast range, $3\frac{1}{2}$ miles south-eastward of the former, bearing S.E. by E. $\frac{1}{2}$ E., clears the western extreme of the shoal; see view on chart. Ras Gharib light bearing South also leads $1\frac{1}{2}$ miles westward of it. Do not stand into less than 30 fathoms in the neighbourhood of this shoal.

Shab el Hassah, a reef which dries in parts at low water, is $2\frac{1}{4}$ miles long north and south, its northern extreme bearing S. by W. $\frac{3}{4}$ W. $2\frac{3}{4}$ miles from Ras Sheratib. The outer edge of Shab el Hassah is $2\frac{1}{4}$ miles from the shore, with which it is united by a shoal bank of from one to 3 fathoms. Between the western side of Shab el Hassah and the Sheratib shoals there is a narrow 7-fathoms channel. A wreck, with the hull above water and masts standing, lies on the western side of Shab el Hassah, about three-quarters of a mile from the south end of the reef.

WEST COAST.—From Ras Gharib to the southward, the reef-fringed shore continues low in a general S.E. by S. direction for 27 miles, where the dark Zeiti hills appear as islets in the distance, with the nearer low cliffs of Ras Shukhair, where the coast begins to rise, projecting from the gently-sloping shore, which should not be approached within $1\frac{1}{2}$ miles nor the water shoaled to less than 20 fathoms. To the southward, this depth is less than a mile from the shore, so it is necessary to be careful in approaching it.

Ras Shukhair. — Anchorage. — Ras Shukhair, $15\frac{1}{2}$ miles S.S.E. $\frac{1}{2}$ E. from Ras Gharib lighthouse, attains a height of 270 feet in low gravel cliffs; it forms the south-eastern extreme of a small bay about a mile deep, in which there is a sheltered anchorage in 4 fathoms, sand and coral, with Ras Gharib lighthouse bearing N.N.W. $\frac{1}{2}$ W. and just touching the northern point of the bay. In the northern part of the bay, 3 fathoms will be found at 5 cables from the shore; in the southern part, that depth is only 2 cables from the shore.

Zeiti hills and Ras.—These hills, when first seen either from the northward or southward, make as islets; they approach the shore closely, the highest point of the range, 1,530 feet high, being only a mile from

the shore, towards which they slope. The Ras projects but slightly from the general line of the coast and is in lat. $27^{\circ} 56' N.$, long. $33^{\circ} 31' E.$ The southern end of the Zeiti hills forms a peninsula, westward of which is the gulf of Zeiti. Westward of the hills, the country is flat, rising gently to the foot of the back range. At $1\frac{1}{2}$ miles north-westward of Umm-el-Kyaman islet, and close to the shore, are some petroleum wells, occasionally worked, and some old huts. There are no dangers off the coast in the vicinity of the Zeiti hills, the deep water extending within a cable of the shore; they should be kept aboard at night until Ashrafi light is sighted.

Umm-el-Kyaman islet.—**Anchorage.**—Abreast of the southern end of the Zeiti hills, a coral reef with the low sandy islet Umm-el-Kyaman, projects nearly half a mile from the land. Southward of Umm-el-Kyaman there is a sheltered and convenient anchorage, the best on the western side of the gulf except that southward of Zafarana lighthouse, in from 5 to 7 fathoms, sand, with the islet bearing N. by E. from 3 to 5 cables, and Ashrafi lighthouse S.E. by E. $\frac{3}{4}$ E. 7 miles. Inside the island reef there is a boat harbour perfectly protected.

EAST COAST.—Aspect.—In lat. $28^{\circ} 34' N.$, the granite hills of the Jehau coast range, covered in some parts with sand, commence and skirt the shore for 24 miles in a south-easterly direction, terminating in the wedge-shaped hill Jebel Hammam Syedni Musa, 840 feet high, 3 miles northward of Tor. Tor, presently described, is easily distinguished by its grove of palm trees, which, with the exception of a few close to the beach $1\frac{1}{2}$ miles northward of Tor, are the only trees to be seen in the gulf of Suez; they are visible 10 miles.

Southward of Tor there are no coast hills; the land forms an extensive plain, rising gently from the shore to the height of 800 or 1,000 feet at the base of the mountains, here some 15 or 18 miles distant from the shore. This plain also extends a considerable distance northward, on the eastern side of the Húswah range, between Jebel Gubchya and the mountains of the interior. The most conspicuous marks for compass bearings are the hills northward of Tor; Jebel Gernin 'Utud, a prominent dark sugar-loaf peak westward of the main range, and bearing E. by S. $\frac{3}{4}$ S. 14 miles from the anchorage in Tor harbour; and, Jebel Towila, 1,560 feet high, a detached rugged-topped sand-covered hill, $16\frac{1}{2}$ miles farther south-eastward, and bearing E.N.E. from Ashrafi lighthouse.

Between Shab el Hassah and Tor the coast has no outlying dangers, with the exception of two small reefs abreast of Jebel Húswah, but should not be approached nearer than about 3 cables. There is no anchorage along the shore, except an indifferent one about $4\frac{1}{2}$ miles northward of

See charts, Nos. 757 and 2,838.

lighthouse, the coast in the intermediate space being without any prominent points, though slightly indented, but not in any part receding more than $5\frac{1}{2}$ miles from an imaginary line connecting the two lighthouses.

Mountains.—South-westward of Zafarana lighthouse, and 16 miles distant, the high table-lands of Abu Regim and Jebel Zafarana rise to the height of 4,750 feet. The north-eastern end of their summit is conspicuously marked by a nipple-shaped hill rising out of the range at a slightly less altitude. Jebel Thlema, 8 miles S.W. from Zafarana lighthouse, and 3 miles inland, is 2,175 feet high, has four knobs on it, and is one of the most useful landmarks in this part of the gulf.

Jebel Ruahmi, in lat. $28^{\circ} 30' N.$, long. $32^{\circ} 34' E.$, and 16 miles from the nearest part of the coast, is a rugged-topped hill with a sharp conical peak at its southern end, 3,575 in height, which forms a good and conspicuous mark.

Jebel Gharib, in lat. $28^{\circ} 6\frac{1}{2}' N.$, long. $32^{\circ} 54' E.$, and 16 miles from the nearest part of the shore, is 5,740 feet high, a solitary and precipitous peak of a beautiful form. This mountain can almost always be seen at night, and is a most useful mark for ships running up and down the gulf.

Soundings.—Between Zafarana point and Ras Gharib the 20-fathoms contour-line of soundings does not approach the western shore in any part within a mile, except about 7 or 8 miles northward of Ras Gharib, where it is about 8 cables off-shore. A reef fringes the shore the whole distance between Zafarana point and Ras Gharib, but does not stretch seaward more than half a mile at any part, except in the vicinity of Zafarana lighthouse, as already mentioned. In the fairway, from 32 to 37 fathoms will be found, but a ship certain of her distance from the western shore may approach to within $1\frac{1}{2}$ miles of it.

Anchorage.—Ras Abu Baka, 15 miles N.W. by N. from Ras Gharib, forms the eastern extreme of a bay in which good anchorage may be found in from 6 to 8 fathoms, with protection from southerly winds; from the anchorage, Jebel Jehan, on the eastern shore, bears E. by S. $\frac{1}{8}$ S. 20 or 21 miles distant.

RAS GHARIB LIGHT.—Ras Gharib is a prominent point on the western shore at the foot of a low white-faced range of gravel hills. About 100 yards distant from the beach, in lat $28^{\circ} 21' N.$, long. $33^{\circ} 6\frac{1}{2}' E.$, stands the lighthouse, an iron cylinder 180 feet high, with three supporting stays, the whole painted red, and exhibiting, at an elevation of 165 feet above the sea, a *fixed white* light, visible in clear weather at the distance of 20 miles. At the base of the lighthouse is the keeper's dwelling, a circular building painted white; *see view on chart.*

See chart, No. 757.

A reef extends half a mile south-eastward from the lighthouse, and an iron pile jetty, 180 feet long, extends from the shore near the lighthouse; there are $4\frac{1}{2}$ feet water at its head at high water springs, the rise then being about 18 inches: boats can nearly always go alongside. This jetty is to be lengthened 110 feet. Ras Gharib has communication by camel with Suez once a fortnight; the journey occupies four days.

Anchorage.—There is tolerably well-sheltered anchorage in 4 or 5 fathoms southward of the reef, but the flood tide is strong and ships do not usually swing to a northerly wind. A heavy swell sets round the point.

EAST COAST.—Mountains.—On the eastern shore, southward of Jebel Hammam Firaun and Jebel Useit, the broken-up white coast hills gradually decrease in height until, at 16 miles south-eastward of the latter, close to a wadi, or valley, they end westward of an outlying spur of the dark granite range of Jebel Sumra. About 11 miles further southward, the light-coloured hills again rise, and, gradually increasing in height and becoming more and more covered with sand, join the Jehan granite coast range, of which Jebel Jehan, 1,420 feet high, is the northernmost peak. At Ras Sheratib the break in the light-coloured hills, showing prominently against the dark range at the back, forms a good mark for ascertaining the ship's position.

From the neighbourhood of Zafarana, on the West coast, the lofty and massive mountain, Jebel Serbal, 6,680 feet high, and the more distant sugar-loaf peak Umm Shomer, 8,530 feet high (one of the Sinai range, and nearly 80 miles south-eastward from Zafarana), are seen rising high above the East coast hills. When a little farther southward, the dark Jehan and Húswah range, on the eastern coast, have the appearance of an island.

Soundings.—Southward of Kad Mallap shoal and as far as Ras Sheratib, the coast is fringed by a reef extending seaward from 2 to 8 cables in some places. With the exception of a small part near Jebel Useit, the 20-fathoms contour-line of soundings does not approach the coast reef within $1\frac{1}{4}$ miles.

Anchorage.—**Ras Abu Zenima**, 11 miles south-eastward of Jebel Hammam Firaun, is a low gravel point, having shoal water extending from it three-quarters of a mile in a southerly direction. The small bay, commencing about a mile eastward of Ras Abu Zenima, is one of the best sheltered anchorages on the eastern side of the gulf. A sheikh's tomb is erected on the southern side of the point. The camel track from Mount Sinai and Tor to Suez passes close to the shore in this vicinity. The gulf is 23 miles wide at this part.

There is no other anchorage on this shore between that just described and Tor harbour, 57 miles farther south-eastward, except a very indifferent one 4 miles northward of that port.

Ras Sheratíb is a low sandy point on the eastern side of the gulf, in lat. $28^{\circ} 40'$ N. In this locality the hills are 2 or 3 miles distant from the shore.

SHERATÍB SHOALS are a narrow ridge of rocks with from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms water, about $3\frac{1}{4}$ miles long in an E.S.E. and W.N.W. direction; their western extreme bears S.W. $\frac{1}{2}$ W. $6\frac{1}{2}$ miles from Ras Sheratíb, and S.S.E. $\frac{3}{4}$ E. 39 miles from Zafarana lighthouse; they narrow the navigable channel down the gulf at this part to $7\frac{1}{2}$ miles. A strong tide race runs over the ridge even in calm weather.

Clearing Marks.—The Ass's Ears or Jebel Abu Durba, a remarkable double boulder rock on the Jehan range, $2\frac{1}{2}$ miles southward of the peak, on with the summit of Jebel Húswah, the highest hill on the coast range, $3\frac{1}{2}$ miles south-eastward of the former, bearing S.E. by E. $\frac{1}{2}$ E., clears the western extreme of the shoal; *see* view on chart. Ras Gharib light bearing South also leads $1\frac{1}{2}$ miles westward of it. Do not stand into less than 30 fathoms in the neighbourhood of this shoal.

Shab el Hassah, a reef which dries in parts at low water, is $2\frac{1}{4}$ miles long north and south, its northern extreme bearing S. by W. $\frac{3}{4}$ W. $2\frac{3}{4}$ miles from Ras Sheratíb. The outer edge of Shab el Hassah is $2\frac{1}{4}$ miles from the shore, with which it is united by a shoal bank of from one to 3 fathoms. Between the western side of Shab el Hassah and the Sheratíb shoals there is a narrow 7-fathoms channel. A wreck, with the hull above water and masts standing, lies on the western side of Shab el Hassah, about three-quarters of a mile from the south end of the reef.

WEST COAST.—From Ras Gharib to the southward, the reef-fringed shore continues low in a general S.E. by S. direction for 27 miles, where the dark Zeiti hills appear as islets in the distance, with the nearer low cliffs of Ras Shukhair, where the coast begins to rise, projecting from the gently-sloping shore, which should not be approached within $1\frac{1}{2}$ miles nor the water shoaled to less than 20 fathoms. To the southward, this depth is less than a mile from the shore, so it is necessary to be careful in approaching it.

Ras Shukhair. — Anchorage.—Ras Shukhair, $15\frac{1}{2}$ miles S.S.E. $\frac{1}{2}$ E. from Ras Gharib lighthouse, attains a height of 270 feet in low gravel cliffs; it forms the south-eastern extreme of a small bay about a mile deep, in which there is a sheltered anchorage in 4 fathoms, sand and coral, with Ras Gharib lighthouse bearing N.N.W. $\frac{1}{2}$ W. and just touching the northern point of the bay. In the northern part of the bay, 3 fathoms will be found at 5 cables from the shore; in the southern part, that depth is only 2 cables from the shore.

Zeiti hills and Ras.—These hills, when first seen either from the northward or southward, make as islets; they approach the shore closely, the highest point of the range, 1,530 feet high, being only a mile from

the shore, towards which they slope. The Ras projects but slightly from the general line of the coast and is in lat. $27^{\circ} 56' N.$, long. $33^{\circ} 31' E.$ The southern end of the Zeiti hills forms a peninsula, westward of which is the gulf of Zeiti. Westward of the hills, the country is flat, rising gently to the foot of the back range. At $1\frac{1}{3}$ miles north-westward of Umm-el-Kyaman islet, and close to the shore, are some petroleum wells, occasionally worked, and some old huts. There are no dangers off the coast in the vicinity of the Zeiti hills, the deep water extending within a cable of the shore; they should be kept aboard at night until Ashrafi light is sighted.

Umm-el-Kyaman islet.—Anchorage.—Abreast of the southern end of the Zeiti hills, a coral reef with the low sandy islet Umm-el-Kyaman, projects nearly half a mile from the land. Southward of Umm-el-Kyaman there is a sheltered and convenient anchorage, the best on the western side of the gulf except that southward of Zafarana lighthouse, in from 5 to 7 fathoms, sand, with the islet bearing N. by E. from 3 to 5 cables, and Ashrafi lighthouse S.E. by E. $\frac{3}{4}$ E. 7 miles. Inside the island reef there is a boat harbour perfectly protected.

EAST COAST.—Aspect.—In lat. $28^{\circ} 34' N.$, the granite hills of the Jehan coast range, covered in some parts with sand, commence and skirt the shore for 24 miles in a south-easterly direction, terminating in the wedge-shaped hill Jebel Hammam Syedni Musa, 840 feet high, 3 miles northward of Tor. Tor, presently described, is easily distinguished by its grove of palm trees, which, with the exception of a few close to the beach $1\frac{1}{2}$ miles northward of Tor, are the only trees to be seen in the gulf of Suez; they are visible 10 miles.

Southward of Tor there are no coast hills; the land forms an extensive plain, rising gently from the shore to the height of 800 or 1,000 feet at the base of the mountains, here some 15 or 18 miles distant from the shore. This plain also extends a considerable distance northward, on the eastern side of the Húswah range, between Jebel Gabeliya and the mountains of the interior. The most conspicuous marks for compass bearings are the hills northward of Tor; Jebel Gerain Utud, a prominent dark sugar-loaf peak westward of the main range, and bearing E. by S. $\frac{3}{4}$ S. 14 miles from the anchorage in Tor harbour; and, Jebel Towila, 1,560 feet high, a detached rugged-topped sand-covered hill, $16\frac{1}{2}$ miles farther south-eastward, and bearing E.N.E. from Ashrafi lighthouse.

Between Shab el Hassah and Tor the coast has no outlying dangers, with the exception of two small reefs abreast of Jebel Húswah, but should not be approached nearer than about 3 cables. There is no anchorage along the shore, except an indifferent one about $4\frac{1}{2}$ miles northward of

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Tor, abreast of a few low palm trees close to the beach, near a spring of brackish water.

Jebel Abu Durba, or Ass's Ears, is a remarkable hill on the Jehan range, close to the shore and 1,266 feet high. An idea of its shape may be inferred from its name. The range is the most northern of the granite coast hills.

Mount Sinai.—The summit of this mountain, 7,450 feet high, is in lat. $28^{\circ} 32' 6''$ N., long. $33^{\circ} 58' 38''$ E. No part of the gulf of Suez, except a very small portion near the bluff of Jebel Hamman Firaun, can be seen from mount Sinai; Tor and all the coast of Egypt being hidden by Jebel Katherina, 1,180 feet higher than Sinai and lying 2 miles westward of it.

Soundings.—The 20-fathoms contour-line, abreast of the Jehan hills, is within 5 cables of the shore at some places, but farther southward it is at a greater distance. As the various contour-lines of equal depths are clearly marked on the chart, it is not necessary to give their various inflexions, as they are more readily understood by reference to the chart than by a written description.

Tor bank, nearly in the centre of the gulf, which is here 16 miles wide, is an extensive bank of soundings, having general depths of from 10 to 20 fathoms, sand and shells, with coral shoals of from 3 to 9 fathoms, the only part with as little as 3 fathoms being the Moresby shoal, next described; and there is a patch of 4 fathoms N.N.W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles from the Moresby shoal.

MORESBY SHOAL, E. $\frac{3}{4}$ N. $9\frac{1}{2}$ miles from Ras Shukhair, and on which there are only 3 fathoms, is the shoalest part at the southern end of the Tor bank. From this shoal, Ras Gharib lighthouse bears N.W. $\frac{7}{8}$ W. 21 miles nearly, and Ashrafi lighthouse S.S.E. $\frac{3}{8}$ E. $26\frac{1}{2}$ miles, being one mile outside the limit of visibility of the former, and $8\frac{1}{2}$ miles outside that of the latter. In proceeding southward, however, Ras Gharib light can generally be seen from aloft until after the shoal is past; to ensure clearing it, the light should not be brought westward of N.W. $\frac{1}{2}$ W. The highest part of the Zeiti hills bearing S. by E. leads a mile westward of the Moresby shoal. When Jebel Gharib bears W. $\frac{1}{4}$ S. a ship is abreast of the shoal.

Felix Jones patches are 9 miles south-eastward of the Moresby shoal and bear E.N.E. from 5 to 7 miles distant from the northern part of the Zeiti hills; they are of coral, with depths of 8 and 9 fathoms. Although the bottom is seen very distinctly, even from the deck, when passing these coral shoals, they may be crossed over with confidence as they have been closely examined.

See charts, Nos. 757 and 2,838.

TOR HARBOUR, in lat. $28^{\circ} 13' N.$, long. $33^{\circ} 37' E.$, affords good anchorage; it consists of a small bay, from the western end of which a sand and coral spit, marked by a beacon 6 feet high, extends 5 or 6 cables to the southward. It is protected from the south-westward by the Erg Riyah reef, with a passage on either side of the reef. The harbour is not sufficiently roomy for very large vessels, nor for the number of smaller vessels by which it is sometimes filled during the pilgrim season. The town stands at the northern end of the harbour, and has some well-built stone houses, a large Greek church, and a garden with good water. Southward of the town is an old fort in ruins. Communication is kept up with Suez and with the monastery at mount Sinai by means of camels. The journey to the latter place occupies two days and a half over a very bad road.

About $1\frac{1}{2}$ miles N.W. from Tor, at the foot of some low hills, is a square building or tower at the foot of a large date grove belonging to the convent of mount Sinai; this date grove is watered by a large and clear spring of brackish water, situated close at the back of the garden walls near the hills; it has a temperature of about 95° and makes an excellent warm bath.

Quarantine.—During the pilgrim season—from February to May—a sanitary commission from Alexandria resides here. Tor is not visited by pilgrims direct, but if a pilgrim vessel arrives at Suez and an epidemic shows itself during the five days' quarantine to which she is subject at Suez, she is sent to Tor to ride out a longer quarantine.

Supplies in any considerable quantity are not to be obtained at Tor; fresh bread may be obtained, the beef is very poor. Fresh water in small quantities may be had, but the water in the wells near the beach is brackish. Plenty of fruit is at times brought in from the country.

Erg Riyah reef.—Beacon.—This reef is about a mile long by 3 cables wide and has on it from 4 feet to 3 fathoms water; even with strong north-westerly winds the sea rarely breaks on it, and it must therefore be approached with caution. Between this shoal and the coral spit, marked by the beacon, there is a navigable channel 4 cables wide, whilst between it and the eastern shore there is a clear channel 6 cables wide.

Near the centre of Erg Riyah, at the north-eastern edge of its shoal part, there is an iron triangular beacon, 12 feet high, surmounted by a globe.

A coral shoal of small extent and with $3\frac{1}{4}$ fathoms water lies almost in the centre of the entrance to the harbour, with the western part of the ruined fort bearing N. by E. and the spit beacon N.W. by W. $\frac{1}{4}$ W., $3\frac{1}{2}$ cables.

See chart, No. 2,838, and plan on No. 8a.

The shore reefs extend westward 3 cables from the old ruined fort, and the whole of the head of the harbour has only from one to 3 fathoms water.

Southward and westward of Tor, there are several coral patches with from 6 to 10 fathoms water.

Depths.—The least water in entering the harbour by either channel is 7 fathoms; as the spit is rounded, there are 6 fathoms, in which depth is the anchorage about in line between the shore reef-beacon and the ruined fort, with the latter bearing N.E., and with the spit beacon $1\frac{1}{2}$ or 2 cables distant.

Directions.—With the prevailing north-westerly winds, the northern channel is the best for a sailing ship entering the harbour and the eastern channel the best for quitting it.

In entering by the northern channel, Jebel Hammam Syedni Musa, the first bluff northward of Tor, bearing North leads 7 cables westward of Erg Riyah reef; when the coral spit on the northern side, which shows green, is sighted, skirt along it, keeping it closer aboard than Erg Riyah reef, as it is more easily seen. After rounding the spit, anchor in the berth described, bearing in mind that the water shoals very quickly from 7 to 3 fathoms.

Entering by the eastern channel, the eye is the only guide, the beacons being very indistinct until the ship is close-to; the shore reef is more easily seen than Erg Riyah, and therefore should be closed with until the beacon upon the spit is seen, when it may be steered for, bearing N. $\frac{1}{2}$ W., and the harbour entered as before. In entering by this passage, it is necessary to keep well up for the spit beacon as it is neared, so as to avoid the $3\frac{1}{4}$ -fathoms patch before described.

SHEIKH RIYAH harbour, 5 miles south-eastward of Tor, is another well-sheltered anchorage inside a low sandy point, from which a clearly defined reef extends in a southerly direction, and from its southern extreme it is prolonged S.E. by S. more than half a mile by a rocky shoal with from $1\frac{1}{2}$ to 3 fathoms water.

The channel between the reef described and the shore reef eastward of it is about 3 cables wide with a least depth of 4 fathoms and clear of all danger. Anchorage may be found anywhere in the bay in from 5 to 7 fathoms, the anchorage ground being about 7 cables in diameter.

Shoal.—At $2\frac{1}{2}$ miles south-westward of Sheikh Riyah harbour there is a coral patch of 4 fathoms, at the northern end of a shoal $2\frac{1}{2}$ miles in length with from 5 to 10 fathoms.

Reefs on the Eastern Shore.—**Poynder shoal.**—Between Tor harbour and the northern part of Shab Ali reef are several reefs with outlying patches, rendering navigation on this side of the gulf more than

See chart, No. 2,838.

usually dangerous. Of these, the most outlying are Shab Jarrah, $2\frac{1}{2}$ miles in length N.N.W. and S.S.E. and partly uncovered at low water; and Poynder shoal, a small rocky 3-fathoms patch $4\frac{1}{2}$ miles north-westward of Shab Ali and 5 miles distant from the eastern shore of the gulf.

The STRAIT of JUBAL, between the coast of Egypt and the south-western shore of the Sinai peninsula, forms the junction between the Red sea and the gulf of Suez. The strait extends N.W. and S.E. from the peninsula of Zeiti to the island of Shadwán on the Egyptian side, and from Ras Iknaisi to Ras Muhammed on the Arabian side.

East coast.—The Arabian coast consists of an extensive sandy plain reaching to the foot of the high mountain range about 14 miles from the sea. The shore is fringed with dangerous coral reefs extending in places 7 miles from it, as Shab Mahmoud, Shab Ali, and others, giving little warning by the lead, but avoidable during daylight by keeping a good look-out, the change in the colour of the water from deep blue to bright green being very apparent.

West coast.—Aspect.—Inshore, westward of the Zeiti hills, the land is flat, rising gently to the foot of the back range of hills, which, running in a S.S.E. direction, approach the coast 15 miles farther southward. From the southern point of the Zeiti peninsula, the coast is generally low and rises to a range of hills from 1,000 to 2,000 feet high at from 3 to 8 miles inland. In the background, the most conspicuous peaks are the Sugar-loaf mountain, 5,165 feet high, at the northern end of a range; Cap hill, 6,350 feet high; and, Slope hill, 7,165 feet high. *See* view on chart.

From abreast of Ras Zeiti, Ashrafi lighthouse may be seen above the horizon standing by itself, with the peak of Jubal island, 410 feet high, and the tops of the hills on Shadwán island, 990 feet high, a little southward of it. About two-thirds the distance between Ras Zeiti and Jebel Esh are the white cliffy hills of Gimsah, in the neighbourhood of which are petroleum wells and some worked-out sulphur mines. With the exception of these cliffs, the shore and off-lying islands are low and fringed by coral reefs.

Jebel Esh, 1,370 feet high, is the highest part of the range of hills near the shore, 20 miles southward of Umm-el-Kyaman islet. Southward of Jebel Esh the coast becomes flat, and 10 miles S.S.E. of that mountain the coast range ends abruptly.

ASHRAFI ISLANDS and REEFS.—Ashrafi islands, nearly 4 miles eastward of the southern point of the Zeiti peninsula, are $7\frac{1}{2}$ miles long. N.N.W. and S.S.E.; they are composed of dead coral and sand, about 6 to 15 feet high, and lie scattered over the two extensive reefs

Ras Sheratib is a low sandy point on the eastern side of the gulf, in lat. $28^{\circ} 40' N$. In this locality the hills are 2 or 3 miles distant from the shore.

SHERATIB SHOALS are a narrow ridge of rocks with from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms water, about $3\frac{1}{4}$ miles long in an E.S.E. and W.N.W. direction; their western extreme bears S.W. $\frac{1}{2}$ W. $6\frac{1}{2}$ miles from Ras Sheratib, and S.S.E. $\frac{3}{4}$ E. 39 miles from Zafarana lighthouse; they narrow the navigable channel down the gulf at this part to $7\frac{1}{2}$ miles. A strong tide race runs over the ridge even in calm weather.

Clearing Marks.—The Ass's Ears or Jebel Abu Durba, a remarkable double boulder rock on the Jehan range, $2\frac{1}{2}$ miles southward of the peak, on with the summit of Jebel Húswah, the highest hill on the coast range, $3\frac{1}{2}$ miles south-eastward of the former, bearing S.E. by E. $\frac{1}{2}$ E., clears the western extreme of the shoal; *see* view on chart. Ras Gharib light bearing South also leads $1\frac{1}{2}$ miles westward of it. Do not stand into less than 30 fathoms in the neighbourhood of this shoal.

Shab el Hassah, a reef which dries in parts at low water, is $2\frac{1}{4}$ miles long north and south, its northern extreme bearing S. by W. $\frac{3}{4}$ W. $2\frac{3}{4}$ miles from Ras Sheratib. The outer edge of Shab el Hassah is $2\frac{1}{4}$ miles from the shore, with which it is united by a shoal bank of from one to 3 fathoms. Between the western side of Shab el Hassah and the Sheratib shoals there is a narrow 7-fathoms channel. A wreck, with the hull above water and masts standing, lies on the western side of Shab el Hassah, about three-quarters of a mile from the south end of the reef.

WEST COAST.—From Ras Gharib to the southward, the reef-fringed shore continues low in a general S.E. by S. direction for 27 miles, where the dark Zeiti hills appear as islets in the distance, with the nearer low cliffs of Ras Shukhair, where the coast begins to rise, projecting from the gently-sloping shore, which should not be approached within $1\frac{1}{2}$ miles nor the water shoaled to less than 20 fathoms. To the southward, this depth is less than a mile from the shore, so it is necessary to be careful in approaching it.

Ras Shukhair. — Anchorage. — Ras Shukhair, $15\frac{1}{2}$ miles S.S.E. $\frac{1}{2}$ E. from Ras Gharib lighthouse, attains a height of 270 feet in low gravel cliffs; it forms the south-eastern extreme of a small bay about a mile deep, in which there is a sheltered anchorage in 4 fathoms, sand and coral, with Ras Gharib lighthouse bearing N.N.W. $\frac{1}{2}$ W. and just touching the northern point of the bay. In the northern part of the bay, 3 fathoms will be found at 5 cables from the shore; in the southern part, that depth is only 2 cables from the shore.

Zeiti hills and Ras.—These hills, when first seen either from the northward or southward, make as islets; they approach the shore closely, the highest point of the range, 1,530 feet high, being only a mile from

the shore, towards which they slope. The Ras projects but slightly from the general line of the coast and is in lat. $27^{\circ} 56' N.$, long. $33^{\circ} 31' E.$ The southern end of the Zeiti hills forms a peninsula, westward of which is the gulf of Zeiti. Westward of the hills, the country is flat, rising gently to the foot of the back range. At $1\frac{1}{3}$ miles north-westward of Umm-el-Kyaman islet, and close to the shore, are some petroleum wells, occasionally worked, and some old huts. There are no dangers off the coast in the vicinity of the Zeiti hills, the deep water extending within a cable of the shore; they should be kept aboard at night until Ashrafi light is sighted.

Umm-el-Kyaman islet.—Anchorage.—Abreast of the southern end of the Zeiti hills, a coral reef with the low sandy islet Umm-el-Kyaman, projects nearly half a mile from the land. Southward of Umm-el-Kyaman there is a sheltered and convenient anchorage, the best on the western side of the gulf except that southward of Zafarana lighthouse, in from 5 to 7 fathoms, sand, with the islet bearing N. by E. from 3 to 5 cables, and Ashrafi lighthouse S.E. by E. $\frac{3}{4}$ E. 7 miles. Inside the island reef there is a boat harbour perfectly protected.

EAST COAST.—Aspect.—In lat. $28^{\circ} 34' N.$, the granite hills of the Jehan coast range, covered in some parts with sand, commence and skirt the shore for 24 miles in a south-easterly direction, terminating in the wedge-shaped hill Jebel Hammam Syedni Musa, 840 feet high, 3 miles northward of Tor. Tor, presently described, is easily distinguished by its grove of palm trees, which, with the exception of a few close to the beach $1\frac{1}{2}$ miles northward of Tor, are the only trees to be seen in the gulf of Suez; they are visible 10 miles.

Southward of Tor there are no coast hills; the land forms an extensive plain, rising gently from the shore to the height of 800 or 1,000 feet at the base of the mountains, here some 15 or 18 miles distant from the shore. This plain also extends a considerable distance northward, on the eastern side of the Húswah range, between Jebel Gabeliya and the mountains of the interior. The most conspicuous marks for compass bearings are the hills northward of Tor; Jebel Gerain Utud, a prominent dark sugar-loaf peak westward of the main range, and bearing E. by S. $\frac{3}{4}$ S. 14 miles from the anchorage in Tor harbour; and, Jebel Towila, 1,560 feet high, a detached rugged-topped sand-covered hill, $16\frac{1}{2}$ miles farther south-eastward, and bearing E.N.E. from Ashrafi lighthouse.

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Tor, abreast of a few low palm trees close to the beach, near a spring of brackish water.

Jebel Abu Durba, or Ass's Ears, is a remarkable hill on the Jehan range, close to the shore and 1,266 feet high. An idea of its shape may be inferred from its name. The range is the most northern of the granite coast hills.

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Soundings.—The 20-fathoms contour-line, abreast of the Jehan hills, is within 5 cables of the shore at some places, but farther southward it is at a greater distance. As the various contour-lines of equal depths are clearly marked on the chart, it is not necessary to give their various inflexions, as they are more readily understood by reference to the chart than by a written description.

Tor bank, nearly in the centre of the gulf, which is here 16 miles wide, is an extensive bank of soundings, having general depths of from 10 to 20 fathoms, sand and shells, with coral shoals of from 3 to 9 fathoms, the only part with as little as 3 fathoms being the Moresby shoal, next described; and there is a patch of 4 fathoms N.N.W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles from the Moresby shoal.

MORESBY SHOAL, E. $\frac{3}{4}$ N. $9\frac{1}{2}$ miles from Ras Shukhair, and on which there are only 3 fathoms, is the shoalest part at the southern end of the Tor bank. From this shoal, Ras Gharib lighthouse bears N.W. $\frac{7}{8}$ W. 21 miles nearly, and Ashrafi lighthouse S.S.E. $\frac{2}{3}$ E. $26\frac{1}{2}$ miles, being one mile outside the limit of visibility of the former, and $8\frac{1}{2}$ miles outside that of the latter. In proceeding southward, however, Ras Gharib light can generally be seen from aloft until after the shoal is past; to ensure clearing it, the light should not be brought westward of N.W. $\frac{1}{2}$ W. The highest part of the Zeiti hills bearing S. by E. leads a mile westward of the Moresby shoal. When Jebel Gharib bears W. $\frac{1}{4}$ S. a ship is abreast of the shoal.

Felix Jones patches are 9 miles south-eastward of the Moresby shoal and bear E.N.E. from 5 to 7 miles distant from the northern part of the Zeiti hills; they are of coral, with depths of 8 and 9 fathoms. Although the bottom is seen very distinctly, even from the deck, when passing these coral shoals, they may be crossed over with confidence as they have been closely examined.

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TOR HARBOUR, in lat. $28^{\circ} 13' N.$, long. $33^{\circ} 37' E.$, affords good anchorage; it consists of a small bay, from the western end of which a sand and coral spit, marked by a beacon 6 feet high, extends 5 or 6 cables to the southward. It is protected from the south-westward by the Erg Riyah reef, with a passage on either side of the reef. The harbour is not sufficiently roomy for very large vessels, nor for the number of smaller vessels by which it is sometimes filled during the pilgrim season. The town stands at the northern end of the harbour, and has some well-built stone houses, a large Greek church, and a garden with good water. Southward of the town is an old fort in ruins. Communication is kept up with Suez and with the monastery at mount Sinai by means of camels. The journey to the latter place occupies two days and a half over a very bad road.

About $1\frac{1}{2}$ miles N.W. from Tor, at the foot of some low hills, is a square building or tower at the foot of a large date grove belonging to the convent of mount Sinai; this date grove is watered by a large and clear spring of brackish water, situated close at the back of the garden walls near the hills; it has a temperature of about 95° and makes an excellent warm bath.

Quarantine.—During the pilgrim season—from February to May—a sanitary commission from Alexandria resides here. Tor is not visited by pilgrims direct, but if a pilgrim vessel arrives at Suez and an epidemic shows itself during the five days' quarantine to which she is subject at Suez, she is sent to Tor to ride out a longer quarantine.

Supplies in any considerable quantity are not to be obtained at Tor; fresh bread may be obtained, the beef is very poor. Fresh water in small quantities may be had, but the water in the wells near the beach is brackish. Plenty of fruit is at times brought in from the country.

Erg Riyah reef.—Beacon.—This reef is about a mile long by 3 cables wide and has on it from 4 feet to 3 fathoms water; even with strong north-westerly winds the sea rarely breaks on it, and it must therefore be approached with caution. Between this shoal and the coral spit, marked by the beacon, there is a navigable channel 4 cables wide, whilst between it and the eastern shore there is a clear channel 6 cables wide.

Near the centre of Erg Riyah, at the north-eastern edge of its shoal part, there is an iron triangular beacon, 12 feet high, surmounted by a globe.

A coral shoal of small extent and with $3\frac{1}{4}$ fathoms water lies almost in the centre of the entrance to the harbour, with the western part of the ruined fort bearing N. by E. and the spit beacon N.W. by W. $\frac{1}{4}$ W., $3\frac{1}{2}$ cables.

The shore reefs extend westward 3 cables from the old ruined fort, and the whole of the head of the harbour has only from one to 3 fathoms water.

Southward and westward of Tor, there are several coral patches with from 6 to 10 fathoms water.

Depths.—The least water in entering the harbour by either channel is 7 fathoms; as the spit is rounded, there are 6 fathoms, in which depth is the anchorage about in line between the shore reef-beacon and the ruined fort, with the latter bearing N.E., and with the spit beacon $1\frac{1}{2}$ or 2 cables distant.

Directions.—With the prevailing north-westerly winds, the northern channel is the best for a sailing ship entering the harbour and the eastern channel the best for quitting it.

In entering by the northern channel, Jebel Hammam Syedni Musa, the first bluff northward of Tor, bearing North leads 7 cables westward of Erg Riyah reef; when the coral spit on the northern side, which shows green, is sighted, skirt along it, keeping it closer aboard than Erg Riyah reef, as it is more easily seen. After rounding the spit, anchor in the berth described, bearing in mind that the water shoals very quickly from 7 to 3 fathoms.

Entering by the eastern channel, the eye is the only guide, the beacons being very indistinct until the ship is close-to; the shore reef is more easily seen than Erg Riyah, and therefore should be closed with until the beacon upon the spit is seen, when it may be steered for, bearing N. $\frac{1}{2}$ W., and the harbour entered as before. In entering by this passage, it is necessary to keep well up for the spit beacon as it is neared, so as to avoid the $3\frac{1}{4}$ -fathoms patch before described.

SHEIKH RIYAH harbour, 5 miles south-eastward of Tor, is another well-sheltered anchorage inside a low sandy point, from which a clearly defined reef extends in a southerly direction, and from its southern extreme it is prolonged S.E. by S. more than half a mile by a rocky shoal with from $1\frac{1}{2}$ to 3 fathoms water.

The channel between the reef described and the shore reef eastward of it is about 3 cables wide with a least depth of 4 fathoms and clear of all danger. Anchorage may be found anywhere in the bay in from 5 to 7 fathoms, the anchorage ground being about 7 cables in diameter.

Shoal.—At $2\frac{1}{2}$ miles south-westward of Sheikh Riyah harbour there is a coral patch of 4 fathoms, at the northern end of a shoal $2\frac{1}{2}$ miles in length with from 5 to 10 fathoms.

Reefs on the Eastern Shore.—**Poynder shoal.**—Between Tor harbour and the northern part of Shab Ali reef are several reefs with outlying patches, rendering navigation on this side of the gulf more than

See chart, No. 2,838.

usually dangerous. Of these, the most outlying are Shab Jarrah, $2\frac{1}{2}$ miles in length N.N.W. and S.S.E. and partly uncovered at low water; and Poynder shoal, a small rocky 3-fathoms patch $4\frac{1}{2}$ miles north-westward of Shab Ali and 5 miles distant from the eastern shore of the gulf.

The STRAIT of JUBAL, between the coast of Egypt and the south-western shore of the Sinai peninsula, forms the junction between the Red sea and the gulf of Suez. The strait extends N.W. and S.E. from the peninsula of Zeiti to the island of Shadwán on the Egyptian side, and from Ras Iknaisi to Ras Muhammed on the Arabian side.

East coast.—The Arabian coast consists of an extensive sandy plain reaching to the foot of the high mountain range about 14 miles from the sea. The shore is fringed with dangerous coral reefs extending in places 7 miles from it, as Shab Mahmoud, Shab Ali, and others, giving little warning by the lead, but avoidable during daylight by keeping a good look-out, the change in the colour of the water from deep blue to bright green being very apparent.

West coast.—Aspect.—Inshore, westward of the Zeiti hills, the land is flat, rising gently to the foot of the back range of hills, which, running in a S.S.E. direction, approach the coast 15 miles farther southward. From the southern point of the Zeiti peninsula, the coast is generally low and rises to a range of hills from 1,000 to 2,000 feet high at from 3 to 8 miles inland. In the background, the most conspicuous peaks are the Sugar-loaf mountain, 5,165 feet high, at the northern end of a range; Cap hill, 6,350 feet high; and, Slope hill, 7,165 feet high. *See* view on chart.

From abreast of Ras Zeiti, Ashrafi lighthouse may be seen above the horizon standing by itself, with the peak of Jubal island, 410 feet high, and the tops of the hills on Shadwán island, 990 feet high, a little southward of it. About two-thirds the distance between Ras Zeiti and Jebel Esh are the white cliffy hills of Gimsah, in the neighbourhood of which are petroleum wells and some worked-out sulphur mines. With the exception of these cliffs, the shore and off-lying islands are low and fringed by coral reefs.

Jebel Esh, 1,370 feet high, is the highest part of the range of hills near the shore, 20 miles southward of Umm-el-Kyaman islet. Southward of Jebel Esh the coast becomes flat, and 10 miles S.S.E. of that mountain the coast range ends abruptly.

ASHRAFI ISLANDS and REEFS.—Ashrafi islands, nearly 4 miles eastward of the southern point of the Zeiti peninsula, are $7\frac{1}{2}$ miles long. N.N.W. and S.S.E.; they are composed of dead coral and sand, about 6 to 15 feet high, and lie scattered over the two extensive reefs

Shab Ashrafi and Shab Kowarat. There are good channels clear of dangers between the reefs; that between the outer reef and Shab Kowarat being known as the Ashrafi channel; and that westward of Shab Kowarat, as the Kowarat channel. Southward of Shab Ashrafi, the north-western reef of the group, and between it and the reef stretching to the northward from North Gaysúm island, there are two sunken coral rocks, which, however, can easily be seen from the masthead. By day, all dangers northward of Ashrafi are cleared by keeping the lighthouse shut in westward of Shadwán, which island can be seen over the intervening land.

LIGHT.—On the easternmost of the three reefs of Ashrafi, near its northern end, stands the lighthouse, a structure of open ironwork 140 feet high and painted red, from which is exhibited, at 125 feet above the sea, a *revolving white* light, attaining its greatest brilliancy once *every minute*, and visible in clear weather from a distance of 17 miles. An iron jetty has been constructed at the lighthouse, alongside of which boats can go at all times of tide. *See view on chart.*

Shoals.—Shoal water extends half a mile northward and eastward of Ashrafi lighthouse, and $2\frac{1}{4}$ miles southward of it. From the eastward, the water shoals very rapidly towards the lighthouse. The light bearing S.E. by S. leads a mile eastward of Shab Ashrafi, and the light bearing N.W. leads $1\frac{1}{2}$ miles eastward of Jubal Sería and nearly 2 miles eastward of Shab Abu Nahas. But, as so frequently remarked, when within 2 miles of the reefs the tides are so uncertain in their direction that when the given bearings are approached, much caution is necessary. The peak of Jubal island S. by E. $\frac{1}{2}$ E. leads $1\frac{1}{2}$ miles eastward of the Ashrafi reefs.

Shab Kowarat. — Umm-el-Kurush harbour.—In the southern end of this bank, the central and largest of the Ashrafi reefs, is a singular oval basin, called by the Arab pilots Umm-el-Kurush, having from 6 to 7 fathoms water, and a sandy bottom. The entrance to this harbour is through a break in the eastern side of the reef, one mile from the southern point of the Ashrafi islands; the passage has only 14 feet water and is barely 2 cables wide. Vessels drawing 12 feet water may cross the reef at the entrance by keeping the islet off the northern point of North Gaysúm island on a sharp distinct peak on the mainland bearing W. by S. $\frac{1}{2}$ S. until the water deepens to 6 fathoms; then haul sharply to the northward for Umm el-Kurush islet, to avoid a shoal patch inside of and fronting the entrance.

Shab Kowarat terminates in the low islet Dhakara, or Sandy island, 5 feet above the level of the sea: there is anchorage in from 7 to 10 fathoms, sand and coral, about 2 cables south-eastward of that islet.

Tides.—It is high water, full and change, at Ashrafi lighthouse at 6 h. The rise, which is much affected by the wind, is 1 foot 9 inches. See remarks on tidal streams at pages 17 and 85.

The GAYSÚM ISLANDS are two islands connected and surrounded by a reef; they lie southward and south-westward of Ashrafi lighthouse, 5 miles distant, in a N.W. and N.E. direction, and form a deep bay running in to the southward, with soundings of from 36 to 20 fathoms, but the north-westerly swell renders it an unsafe anchorage. South Gaysúm, the northern point of which is one mile from Dhakara or Sandy island, is the largest, and remarkable from two hillocks at its northern end, 100 and 37 feet above the sea; the former, conical and of a dark brown colour; the latter, white and sandy. North Gaysúm is flat, having a small hillock 50 feet high on its eastern side; an islet off its north extreme, from which the reef extends N.N.W. 2 miles. Between the north extreme of the reef and the sandbank on the southern end of Shab Ashrafi are the two sunken rocks already mentioned. On the eastern side of the reef extending from North Gaysúm are some detached rocks; the western side has no outlying dangers.

There is an Arab fishing village on the southern shore of South Gaysúm, and a few tents are occasionally found on the neighbouring islands.

Anchorage may be found on the south-eastern side of South Gaysúm in 10 or 12 fathoms, with the two eastern points of the island in line N. $\frac{1}{4}$ E., and Jubal island peak E.S.E. South-eastward of this position the water deepens rapidly to 20 and 30 fathoms.

The South point of Zeiti peninsula, 3 miles southward of Umm-el-Kyaman islet, is low and nearly joined to the coral island Ranim, from the south-eastern side of which the reef Shab Ranim extends in that direction $1\frac{1}{2}$ miles.

Southward of the southern point of Zeiti the mainland recedes, forming a large bay, with ranges of hills running parallel with the shore, and terminating westward in a very high and singularly rugged ridge, the heights of whose principal peaks have been already given at page 101; these mountains are about 20 miles from the shore, and visible nearly 100 miles.

South-westward of the Gaysúm islands are a cluster of extensive reefs, which extend southwards about 13 miles from Zeiti point without any navigable channel for large vessels; the chart must be consulted for the intricate passages between them.

JUBAL ISLAND, whose round peak is 410 feet above the sea, is about 3 miles south-eastward of Gaysúm and is $2\frac{1}{2}$ miles in length by $1\frac{1}{2}$ miles in width; it is generally visible at a moderate distance by night, and bearings of it are useful for ascertaining a ship's position. The

eastern side is steep-to, having from 30 to 40 fathoms at the distance of a mile.

Shab Jubal, the coral reef extending northward from Jubal island, is more than 3 miles long, having on it one large and two small islets, with black coral rocks appearing above water round its edges. Off the northern end of the reef, a bank with from 8 to 10 fathoms water extends nearly a mile farther in the same direction. On the eastern side of the reef the deep water extends up to its edge. The largest islet on the reef, Jubal Seria, has a bluff point at its eastern end, and with the north-eastern end of Jubal island, forms a small bay; two wrecks lie on the edge of the reef northward of Bluff point. There are no outlying dangers on the eastern side of Jubal or of Shab Jubal.

Anchorage.—There is good anchorage in about 8 fathoms on a bank of coral and sand, 2 or 3 cables south-eastward of the southern point of Jubal island, with the peak bearing North. Care must be taken to avoid the rocks southward and westward of the anchorage. A strong tidal stream runs over the reefs between Jubal and Towila islands.

TOWILA ISLAND.—Southward and westward of Jubal island, and connected with it by a cluster of reefs and sand-banks, is the low flat coral island Towila, $5\frac{1}{4}$ miles long north and south by $3\frac{1}{4}$ miles wide. The highest part of the island is on the eastern side, and is only from 30 to 50 feet above the sea. An extensive coral reef surrounds Towila, except for about a mile on its eastern side.

Anchorage.—About 3 cables eastward of the southern point of Towila, there is a small sandy cay, only about 3 feet above water. There is good anchorage with this cay bearing N. by E. $\frac{1}{2}$ E. from one to 2 miles distant.

Reefs.—A cluster of coral reefs, more or less detached, extends $6\frac{1}{2}$ miles S.S.E. of the south end of Towila island; of these, Shab Towila and Shab Abu Rakau cover only at high water.

Channels.—Westward of Jubal and Towila islands, and between them and Gaysûm, with the long extent of reefs southward of it, is the clear deep Towila channel, its south-western entrance being well marked by the small low sandy islet Vahari Towila. Eastward of Towila and its long southern extension of shoals, is the Shadwân channel, its narrowest part being between Towila and the Saul reefs, where it is nearly $1\frac{3}{4}$ miles wide.

SAUL ISLETS and REEFS.—Between Jubal and Shadwân islands, and between Towila and Shadwân, there are five detached coral reefs, mostly covered at low water; they are Shab Umm Ūsh, Shab Abu Nahas, Saul Seria and Saul Kebir, and Blind reef. Two of these

See chart, No. 2,838.

reefs, Saul Seria and Saul Kebir, are marked by small coral rock of this name, 10 and 15 feet high. Saul Kebir, the eastern and largest rock, is surrounded by a clearly defined reef having deep water close to it on all sides. One and a quarter miles to the westward, leaving a clear channel, are the three small rocks composing Saul Seria, on the eastern side of an extensive reef $2\frac{1}{4}$ miles long in a north-west and south-east direction, $1\frac{1}{4}$ miles wide, and covered at high water.

Anchorage.—There is anchorage in about 8 fathoms on the southern side of the reef surrounding the islet of Saul Seria, but care must be taken to be clear of the detached rocks at the edge of the reef, of which there are several.

Shab Umm Ūsh or Horse-shoe reef.—From $1\frac{1}{4}$ to 2 miles northward of Saul Kebir is the Horse-shoe reef, its edge being clearly defined, and, except two rocks on its western and north-western side, it has no outlying dangers. This reef does not uncover at low water.

SHAB ABU NAHAS.—About $2\frac{1}{4}$ miles northward of the northern side of Shadwán island is this reef, which only uncovers at extraordinary low tides, and is the most dangerous of the group, it being the closest to the usual track of vessels passing up and down the gulf, only just on the verge of the limit of visibility of Ashrafi light, and within the obscured arc of Shadwán island light. A line drawn from Ashrafi lighthouse to the eastern extreme of Shadwán, as seen from that direction, touches the eastern point of Abu Nahas reef. Jubal peak bearing W.N.W. leads $1\frac{1}{4}$ miles north-eastward of Abu Nahas; the south-eastern part of Shadwán bearing S.S.E. also leads about 2 miles eastward of the reef. Vessels approaching from the northward should keep Ashrafi lighthouse shut in with the eastern part of the Zeiti hills bearing N.W.; this will carry a vessel $1\frac{1}{4}$ miles eastward of the danger. There is deep water close to the northern and eastern sides of Abu Nahas, but south-westward and southward of it there is broken ground.

Blind reef, the last of this group of shoals and also covered at low water, is in mid-channel between Saul Kebir reef and the northern prong of Shadwán north-western reef, and about $7\frac{1}{2}$ cables distant from each. It is about 3 cables long East and West, very narrow, not so easily seen as the others, and has deep water close round it.

SHADWÁN ISLAND, or Isle of Seals, is nearly 8 miles long north-west and south-east, and $2\frac{1}{2}$ miles broad at its widest part. It is high and rugged, with hills much cut up by ravines, the sides being rather steep. At a distance, Shadwán appears fairly flat. The highest hill is near the south-eastern end of the island, and is 990 feet high. Except at its north-western end, where two prongs of reefs project a mile from the shore, deep water extends close in on the northern, eastern, and

southern sides of the island, there being a clearly defined fringe of coral reef from 20 to 40 yards wide with no outlying dangers; *see* also pages 30 and 36.

LIGHT.—From a circular stone lighthouse at the south-eastern extreme of Shadwán island, in lat. $27^{\circ} 27' N.$, long $34^{\circ} 2' E.$, and at an elevation of 120 feet above the sea, is exhibited between the bearings $S. \frac{1}{2} W.$ through west and north, and $E. by S. \frac{1}{2} S.$ a *flashing* light visible in clear weather from a distance of 17 miles. The flashes show alternately *red* and *white* every *thirty seconds*.

Anchorage.—Rock.—On the western side of Shadwán, southward of the reef extending from the north-western end, a low sandy spit, projecting in a south-westerly direction, forms a bay on its southern side; in the middle of this bay, $S.E. by E. \frac{3}{4} E.$ $8\frac{1}{2}$ cables from the sandy spit, is a coral rock having only 2 feet water over it, with 5 fathoms inshore of it and 6 and 7 fathoms on its southern side. Beacons on the shore, white with red bands, in line with small white beacons on the heights behind, the westernmost pair on the bearing $N.N.W. \frac{3}{4} W.$, and the eastern beacons $N.E. \frac{3}{4} N.$, indicate the position of the rock.

Notwithstanding this rock, the bay affords well-sheltered anchorage in 6 or 8 fathoms, sand and coral, with the end of the sand-spit bearing $N.W. \frac{3}{4} W.$ 7 or 8 cables; outside of this, the depth increases very suddenly to 40 and 100 fathoms. To anchor on the western edge of the shelf outside the rock just described, bring the peak of Jubal, just shut in eastward behind the low land of the western point of Shadwán, to bear $N.W. by N.$, and steer for it on that bearing until soundings are obtained.

Extending in a $S.E. by S.$ direction from the cluster of coral reefs southward of Towila island, described at page 104, is a chain of islets and reefs terminating in the Carless reef, $16\frac{1}{4}$ miles from the south extremity of Towila. This chain leaves a clear and deep channel from $4\frac{1}{2}$ to 7 miles wide between it and Shadwán island.

Shab Abu Melana, the north-western reef of the chain referred to, is a circular coral reef about 2 miles in diameter and covered at high water. It bears $N.N.W.$ from Gumarh island, and there is a clear passage between the two reefs rather more than 2 miles wide, as also on its north-western side between it and the outlying rocks of Shab Abu Rakau; the nearest point of Shadwán, the sand-spit before described, is $5\frac{1}{2}$ miles distant to the north-eastward; and Shab Abu Jenzi is $2\frac{3}{4}$ miles distant to the south-westward. On its eastern and northern sides there is deep water close to; but, on its western side, there are several outlying rocks and the soundings are very irregular.

Gumarh island on with the peak of Jifatin Sería $S. by E. \frac{1}{2} E.$ clears this reef, and all those extending south-eastward from Towila island, leading eastward of them and through part of the inner Shadwán channel.

Gumarh island is about 3 cables long N. by E. and S. by W., one cable wide, and composed of coral cliffs 50 feet high; it is surrounded by a well-marked coral reef having deep water alongside, which, from its northern end, extends fully 7 cables in the same direction as the island. It bears S.W. by W. 9 miles from Shadwán lighthouse, and 10 miles N. by W. $\frac{1}{2}$ W. from the peak of Jifatin Seria.

Gumarh and Carless reefs lie respectively S. by E. one mile and S.S.E. $\frac{1}{2}$ E. $3\frac{1}{4}$ miles from Gumarh island, and neither reef uncovers at low water. Carless reef is small and not readily seen; Gumarh reef is about 3 cables in length N. by W. and S. by E., and very narrow. Deep water surrounds both reefs. The peak of Jifatin Seria bearing westward of South, or Gumarh island westward of N.W., leads eastward and northward of both these reefs.

JIFATIN ISLANDS.—These islands, five in number, are from 12 to 17 miles southward of Shadwán island, and from one to 7 miles distant from the mainland.

Jifatin Seria, the second in size, is the most prominent to vessels navigating the gulf, and has a decided peak 330 feet high near the centre of its eastern side. From the northern end of this island, a reef extends in a north-westerly direction nearly $1\frac{1}{2}$ miles, and continues as a fringe all round the island. On the eastern side this fringe is very narrow. Deep water will be found at 2 cables from the eastern side of the island, and from the eastern side of its northern reef.

Jifatin Kebir is about 6 miles long N.N.W. and S.S.E., and $1\frac{1}{4}$ miles wide. From the northern end of this island, a rugged-topped hill commences and extends two-thirds the length of the island, attaining near its centre a height of 350 feet. The southern end of the island is a decayed coral plateau only from 10 to 20 feet high. Except on its north-eastern side, where the coast reef is a mere fringe, reefs extend in places a long distance from the shore, especially on the north-western and western sides.

Anchorage.—A well-sheltered anchorage may be obtained in mid-channel between Jifatin Kebir and Jifatin Seria, in from 7 to 12 fathoms, coral and sand, with the peak of the latter island bearing E. by N. $\frac{1}{2}$ N. The shores on either side of the anchorage are fringed by a broad coral reef with several outlying rocks, so that, in entering, a good look-out from the masthead is required. At the northern entrance the reefs nearly close the channel, and render it so intricate that it cannot be recommended.

To enter the anchorage from the eastward, steer for the peak of Jifatin Seria; when half a mile from the shore, bear up to the southward, hauling round the reef at the southern and south-western ends of the island.

Abu Mingarh island.—The extensive reef stretching 3 miles westward of Jifatin Kebir, and then $1\frac{1}{2}$ miles in a northerly direction, embraces the low woody island Abu Mingarh, 10 feet high. Between the reef westward of Abu Mingarh and the headland of Dish t' Abu Mingarh, 285 feet high, on the mainland, is the narrow Mingarh channel, with a least depth of 4 fathoms, as presently described.

Abu Rimathi, the south-eastern island of the group, is about 8 cables long N. by E. and S. by W., very narrow, wedge-shaped, 63 feet high, and separated from Jifatin Seria by a deep channel 8 cables wide. Abu Rimathi is surrounded by a narrow fringe of coral, except at its southern end, where it extends 4 cables southward of the island.

Shab Abu Rimathi.—Southward of Jifatin Kebir are two coral patches, neither of which uncover, distant respectively 8 cables and $2\frac{1}{2}$ miles. The latter, called Shab Abu Rimathi, is nearly 2 miles S.W. $\frac{3}{4}$ W. from the southern end of the island Abu Rimathi.

Umm Gowish.—Nearly in the centre of the bay formed by Jifatin Kebir and the mainland is the small decayed coral island Umm Gowish, 15 feet high, and the south-westernmost of the Jifatin group, having a ledge of sunken rocks extending $1\frac{1}{2}$ miles off its eastern and south-eastern sides. A bank having from 4 to 6 fathoms water extends from Umm Gowish to Jifatin Kebir. Between Umm Gowish and the extensive reef Shab el Lug is the deep and safe Jifatin channel, half a mile wide at its southern entrance between the southern reef of Umm Gowish and the rocky islet El Ghyaria.

INNER CHANNELS westward of Shadwán.—With regard to the various channels inside the islands, Capt. G. S. Nares, R.N., who surveyed the gulf of Suez in 1872 in H.M.S. *Newport*, remarked that, in consequence of the prevailing north-westerly winds in this locality, steam-vessels of small horse-power may gain considerably by using these channels. He says:—"With a chart and a good look-out aloft, there is no difficulty in the navigation, the difference in the colour of the navigable water and that on the reefs being very apparent, except in a calm, or when the sun is ahead." These inner channels can, however, only be used by daylight; but if overtaken by night before getting clear of the reefs, there are many convenient anchorages in the channels.*

There can be little doubt, however, that with the gradual but steady increase of steam power, vessels are likely to make less use of these channels every year.

Inner Shadwán channel.—The entrance to this channel from the southward is 8 miles wide between the little island Gumarh and

* See remarks on visibility of coral reefs at page 2.
See chart, No. 2,838.

Shadwán. Carless, Gumarh, and all the other reefs, on the western side must be cleared by the marks already given; see page 107. Gumarh island on with Jifatin Seria peak S. by E. $\frac{1}{2}$ E. leads 3 cables eastward of Shab Abu Melana, and into the narrows of the channel. To clear the reef extending north-westward from Shadwán keep the southern extreme of that island eastward of E.S.E. until Saul Kebir islet bears North; and, to clear the Saul islets and reefs bring the two eastern points of Towila island in line N.N.W. $\frac{1}{4}$ W. On this bearing, part of South Gaysúm island is seen between Towila and the small islets on the reef connecting Towila with Jubal island.

When abreast of the highest eastern part of Towila, the Saul reefs will have been passed, and when the peak of Jubal bears N. $\frac{1}{4}$ W., steer to pass out into the strait of Jubal eastward of that island, avoiding the reefs off the bay between Towila and Jubal. The sandy cay off the southern end of Towila on with Cap hill, bearing S.W., leads clear of the Towila reefs and northward of the Saul reefs.

If the sea should prove to be heavy in the open strait, a vessel may still gain some advantage to the northward either by taking one of the passages westward of the Ashrafi islands, as presently described, or by crossing the strait under fore and aft sails and taking the Inner channel eastward of Shab Ali. (See page 111.)

Passages westward of Ashrafi reefs.—If there be much sea in the open, shelter will be gained by passing in to the westward immediately northward of South Gaysúm island, between it and Sandy islet, which islet marks the southern end of the Ashrafi reefs; then through the Kowaret or Zeiti channels; but these channels are very intricate and require a good look-out from aloft while passing the narrows.*

Jifatin channel.—This is the in-shore passage westward of the Jifatin islands. If certain of the ship's position, the African shore may be closed with anywhere northward of the Safája reefs, there being no out-lying dangers on that part of the coast. After passing close to the small islet Saal Hashish, 10 miles S.S.W. from Jifatin Seria island, steer N.N.W., keeping it in sight outside the land northward of it until the low coral island Umm Gowish and the rocky islet El Ghyaria to the westward of it are plainly in sight, the hills of the headland of Dísh t'Abu Mingarh being seen over and between them. Do not allow El Ghyaria to bear westward of N.W. by N. until the channel is fairly open; then alter course as requisite.

* Captain J. P. Maclear, H.M.S. *Flying Fish*, took this route to avoid the sea in April 1887, passing up through the Zeiti channel; he says: "The rocks on the South side of the channel could not be plainly seen from aloft although the light was very favourable."

The channel immediately westward of Umm Gowish is deep and clear of dangers.

In passing between Abu Mingarh island reef and the mainland, be careful of the spit of shallow water running out south-eastward from the headland of Dîsh, which is not so easily distinguished as the coral reef on the eastern side. At this part of the channel, the navigable width between the island and mainland reefs is only about 2 cables, and a narrow bank with from 4 to 5 fathoms water crosses the channel; northward of the bank, the water deepens quickly.

After passing northward of Abu Mingarh and its reefs, the channel widens, and a vessel should steer about N.N.E. with Gumarh island in sight a little on the starboard bow, and the small rocky islets, El Fanadeir, 15 feet high and on the shore reef, broad on the port bow. When Abu Hurghada, a remarkable flat-topped hill 196 feet high, $3\frac{1}{2}$ miles northward of Jebel Dîsh, bears West, a course may be steered to pass on either side of Shab Abu Jenzi.

The passage eastward of Abu Jenzi is the best as it is well marked by Gumarh island; in taking it, steer North, keeping El Fanadeir rocks well open westward of Abu Hurghada until Gumarh island bears E.S.E. The vessel may then pass on either side of Shab Abu Melana into the Shadwân channel, already described, or the course may be altered to N.W. $\frac{1}{2}$ N., which will lead up inside the Abu Melana, Abu Rakau, and Towila reefs to the southern entrance of the Towila channel, which enters the strait of Jubal 7 miles farther northward than does the Shadwân channel.

Cross bearings.—The ship's position is better determined by bearings of the flat peak of Jebel Esh, of Shadwân, and of Jubal, than by any bearings of the low flat island Towila.

Towila channel.—Assuming that the inshore and Towila channels are to be taken:—When Jebel Esh bears W. $\frac{1}{2}$ S., alter course to N. by E. $\frac{1}{2}$ E. for Vahari Towila, a small low sandy islet on the northern side of the channel and $2\frac{3}{4}$ miles southward of South Gaysûm island. The islet will soon be sighted ahead in line with a dark nipple hill on South Gaysûm. The northern point of Towila island a little shut in northward of Jubal peak N.E. by E. $\frac{1}{2}$ E. leads through the narrow passage between Vahari Towila and the large reef off the western side of Towila, which uncovers at low water. There are strong and uncertain tidal streams in the narrows and the depths are from 5 to 8 fathoms.

After passing Vahari Towila, steer N.E. by N. for the low islets on the reef northward of Jubal island, until Ashrafi light opens out eastward of South Gaysûm, when the course must be altered to the northward to get out into the open strait; or, if preferred, to haul round the northern end of South Gaysûm into the Kowarat or Zeiti channels, as described at page 109.

Zeiti channel.—This channel is $12\frac{1}{2}$ miles long from its northern entrance between Umm-el-Kyaman and Shab Ashrafi to its southern end between South Gaysúm and the reefs westward of it; its northern portion is wide and comparatively clear, but the southern part is almost closed by reefs. There is a channel into it for small vessels by the Gaysúm pass, westward of Gaysúm islands; but the Pass between South Gaysúm and Mulhaimet Seria is extremely tortuous, and being full of mushroom-shaped coral rocks, requires very careful navigation. There is also another entrance westward of Mulhaimet Seria, but it is even more tortuous than the last, and $4\frac{1}{2}$ miles in length before more open water is reached.

EAST COAST.—SHAB ALI REEF.—The numerous coral reefs forming Shab Ali, on the eastern side of the strait of Jubal, are $6\frac{3}{4}$ miles distant from Ashrafi lighthouse, and their outer edge is from 7 to 8 miles from the eastern shore of the gulf; they narrow the navigable channel to $6\frac{1}{2}$ miles. These reefs extend 9 miles in a N.N.W. and S.S.E. direction, and do not uncover at low water, except one small rock at the southern end, the Shag, 3 feet only above high water, which bears E. by S. $9\frac{1}{2}$ miles from Ashrafi lighthouse. The wreck of a steamer lies close to the Shag rock (1890), and as long as she holds together makes the position of the rock much more conspicuous.

In thick weather, when near Shab Ali, do not shoal to less than 20 fathoms.

Inner channel.—Inshore of Shab Ali there is a good channel, useful to steamers of small power; it is nearly 9 miles in length and $1\frac{3}{4}$ miles in width at its narrowest part, where Shab Itiguyig extends more than $3\frac{1}{2}$ miles from the shore. There are as little as 8 or 9 fathoms on a narrow shoal neck connecting Shab Ali near its centre with the shore reef; at either end of the channel it is deeper, from 15 to 20 fathoms being about the average. The channel may be safely used during the day; about a N.N.W. course leads through it, but a good look-out must be kept for detached rocks, especially near the northern entrance, where the Azov patch lies well out in the channel; and, again, in steaming out into the strait, the Poynder shoal of 3 fathoms must be carefully avoided.

Anchorage.—There is anchorage in nearly all parts of the Shab Ali channel in smooth water and a moderate depth; vessels may also take temporary shelter under the southern end of the reef, near the Shag rock, in from 15 to 20 fathoms.

Sheltered by Shab Ali and by the shore reefs, are the two anchorages of Mersa Tal Kad Yayah and Mersa Towila, and, farther southward, that under shelter of Shab Mahmoud.

Mersa Tal Kad Yayah.—This harbour is 2 miles eastward of the low sandy point, Ras Iknaisi, in lat. $27^{\circ} 56' N.$, and affords the

best shelter on the eastern side of the gulf. It is protected by the reef extending south-eastward from Ras Iknaïsi. In the entrance are two reefs connected by shoal water called Shab Ryeis. Northward of these reefs is the best channel into the harbour, more than 3 cables wide, and with from 10 to 12 fathoms water. On hauling to the northward round the eastern end of Ras Iknaïsi reef into the harbour, the depth decreases very gradually, and anchorage may be taken up in from 10 to 6 fathoms, mud.

Between Shab Ryeis and the northern tongue of Shab Itiguyig, there is another entrance to the harbour from the southward, but in it are several shoal patches of one and 2 fathoms, rendering it much more intricate than the northern channel; it can however be used if necessary, provided that a good look-out is kept from the masthead. Shab Ryeis is awash at low water.

Mersa Towila is nearly 7 miles south-eastward of Mersa Tul Kad Yayah; it affords protected anchorage in from 5 to 8 fathoms, sand and coral, and, for small craft, there is a very extensive anchorage in from 2 to 4 fathoms, completely sheltered by Shab el Megether, the shore reef on the western side. The entrance is at the south-eastern end of this reef, and the anchorage is nothing but a bight in the shore reefs, the shore itself not forming any considerable bay at this part. There are about 6 fathoms water in the entrance, and there are several coral reefs, but with a good look-out from aloft, it may be entered without danger. From the entrance, Jebel Towila, 1,560 feet high, bears N.N.E. $\frac{1}{2}$ E. $6\frac{1}{2}$ miles.

Shab Mahmoud.—Southward of Mersa Towila, and $3\frac{1}{2}$ miles distant from the entrance, the outer edge of Shab Serúr is $2\frac{3}{4}$ miles from the shore, with a passage half a mile wide between it and the coast reef, which from this spot begins to leave the shore, and stretches off S.E. by S. 7 miles, forming Shab Mahmoud. This reef has, at its south-eastern extreme, two rocks 2 feet above water; the outer rock, known as Beacon rock, is $5\frac{1}{4}$ miles from the nearest land. The remainder of the reef does not uncover at low water, and there is only one break in its whole extent, $5\frac{3}{4}$ miles from the south-eastern extreme. From the Beacon rock, Ras Muhammed bears E. $\frac{1}{2}$ N. $6\frac{3}{4}$ miles, and Shadwán lighthouse S.S.W. $15\frac{3}{4}$ miles.

Anchorage.—There is extensive anchorage under the lee of Shab Mahmoud, and between it and the adjacent reefs of Ras Muhammed; an excellent berth is with Beacon rock bearing S.W. by S. $1\frac{1}{2}$ miles, and Black hill, near Ras Muhammed, E. by N. $\frac{3}{4}$ N. Here there are from 8 to 10 fathoms, sand and coral. There is a narrow intricate 3-fathoms channel to

the anchorage through the break in the reef above mentioned, and between it and the shore reefs, but it cannot be recommended.

RAS MUHAMMED, the south-eastern extreme of the strait of Jubal, is an abrupt broken cliff with a flat top, 90 feet high, decreasing in height to a low plain of gravel and decayed coral a little northward of the cape. In the centre of the plain is Black hill, a remarkable black rounded hillock 190 feet high, with a flat sand-coloured table-hill of nearly the same height, south-eastward of it. From the westward, in mid-channel, these hills appear as islands, with the distant island Tirán showing behind them. When the low land connecting these hills appears above the horizon, the vessel is well over towards the eastern reefs.

Ras Muhammed should be carefully approached at night, as the white cliffs and land are not easily seen. It has deep water with no outlying dangers on its north-eastern and southern shores.

Anchorage.—Westward and north-westward of Ras Muhammed, a coral reef extends a long distance off-shore with many sunken coral rocks near its edge. If necessary, an indifferent anchorage may be obtained amongst them, with Black hill bearing N. by E.

Directions.—Steamers, or sailing vessels with a fair wind, entering Jubal strait from the northward, should keep on the western side of the strait. They will clear all dangers northward of Ashrafi by keeping the lighthouse shut in westward of Shadwán. As the light is approached, Jubal peak bearing S. by E. $\frac{1}{2}$ E. leads $1\frac{1}{2}$ miles eastward of it and of the Ashrafi reefs; after they are passed, the lighthouse should be kept shut in with the Zeiti hills bearing N.W., this leads outside Shab Jubal and $1\frac{3}{4}$ miles eastward of Shab Abu Nahas; or, the south-eastern part of Shadwán bearing S.S.E. leads 2 miles outside the latter reef.

To clear the reefs on the eastern side of the strait;—after passing Ashrafi light, it should not be brought westward of W.N.W. When the light has dipped, the eastern extreme of Shadwán should not be brought westward of S. $\frac{1}{2}$ W., nor Shadwán light opened out, as it will be on a S. $\frac{3}{4}$ W. bearing, until the peak of Jubal island bears West; this leads clear of Shab Mahmoud.

These directions, taken in reversed order, apply equally to vessels from the southward.

In thick weather, do not shoal the water towards Shab Ali to less than 20 fathoms, and to keep a central position in the channel through the strait, a depth of 40 fathoms should be maintained.

Working to windward through the strait of Jubal from the southward; a sailing vessel with the usual north-westerly breeze having worked up to Ras Muhammed (*see* page 278), which may be safely approached to within half a mile, should then stand to the westward,

when the peak of Tirán island on with the flat sand-hill on Ras Muhammed will clear Shab Mahmoud and all the other reefs on the eastern side of the strait. The two rocks, 2 feet high, which mark the southern part of Shab Mahmoud may be seen 3 miles distant; therefore work to windward under the lee of that reef, passing close to its edge.

In standing across the strait to the westward, tack when the reefs northward of Shadwán are closed with. The outer edges of the reefs on either side of the strait are steep-to, with no outlying dangers, and all are distinctly visible by day, except the reef immediately southward of Ashrafi lighthouse, which should be more carefully approached. If there is any sea, their breakers will probably be visible.

Northward of Umm-el-Kyaman islet the gulf opens out, and, with the help of the chart, there should be no difficulty in beating to windward during daylight with a fair tide, or in obtaining an anchorage before night.

In the strait of Jubal, vessels working to windward are recommended to anchor at night, instead of making short tacks and risking being driven to leeward again. The best anchorages, all easily entered and parted from, and all described in the preceding pages, are eastward of Shab Mahmoud; southward of Jubal island; eastward of Shab Ali reef; and, southward of Umm-el-Kyaman islet, near the southern point of the Zeiti hills.

See chart, No. 2,838.

CHAPTER IV.

WEST COAST OF RED SEA FROM JIFATIN ISLANDS TO
KHOR NOWARAT, INCLUDING THE SAWÁKIN GROUP.(Lat. $27^{\circ} 10'$ N. to lat. $18^{\circ} 12'$ N.)VARIATION IN 1900 - - - $3^{\circ} 30'$ W.

GENERAL REMARKS.—The tract described in this chapter embraces the remainder of the Egyptian coast proper, and the whole of the coast of Nubia. At 40 miles southward of the Jifatin islands, the Nile approaches the Red Sea within less than 70 miles; it then increases its distance from it and between lats. $22^{\circ} 35'$ and $19^{\circ} 30'$ N. makes a great bend to the westward. Between the river Nile and the Red sea this vast tract of country forms the stony and sandy desert of Nubia. Mountains forming a continuation of the range traversing Egypt approach the coast we are now considering at various distances. In the northern portion of this tract and as far South as the remarkable Elba mountains, they border on the coast. The general height of the table-land of Nubia in the southern part, which is higher than the northern, is about 4,000 feet, and between it and the coast, a low tract of sandy land intervenes. The shore is studded with reefs, and amongst them are many good anchorages, besides which, under their lee is an inner and smooth water channel very useful for small vessels.

Inner channel, African shore.—This channel may be said to commence at Ras Raweiya, in lat. 21° N., and to end with the South Massawa channel, in about lat. $15^{\circ} 15'$ N. As far as Sawákin the channel is generally from $1\frac{1}{2}$ to 3 miles wide, except in the neighbourhood of Salaka, Dabadiba, and Ras Raweiya, where the limits are half a mile. From Ras Raweiya to Salaka, the most intricate part of the channel, the depths are generally moderate, and again from Mersa Fejer to Mersa Kihai; in all other parts there is very deep water.

From a little southward of Sawákin the channel becomes wider, passing outside the extensive shoals in a bight of the coast commencing about 18 miles below Sawákin, and here soundings may generally be obtained; but, except in the harbours on the coast there are few places where ships

See chart, No. 2,523.

would care to anchor, the bottom being generally rocky with great overfalls. In most of the anchorages northward of Sawákin, it is advisable to moor the ship; and in many places, in blowing weather, it may be prudent to lay out the stream anchor on or near the weather beach.

There are several entrances to this channel from seaward, of which one of the best, northward of Sawákin, is off Mersa Sheikh Barud. Another is off Sawákin, and there is a wide one northward of the Dahalak banks, as also several channels out to seaward over the Dahalak bank, described in the following chapter, northward of Enta-entor island, but none southward of it, except through the South entrance, known as the South Massawa channel, between Ras Andadda and the Dahalak island reefs.

The principal towns or harbours on the whole of this tract of coast are Koseir, Sawákin, and Nowarat, included in the present chapter, and Massawa in the next.

Winds and weather.—In the Inner channel on this shore, northerly winds, inclining to land and sea breezes, are prevalent all the year round; but, as in the parts farther southward, they are light and variable in August and September, when there are also frequent calms; southerly winds are by no means common. From August to October the weather is generally fine, but from November to the end of March is the rainy season on this coast, the rains, however, being light compared with those of other countries; *see* remarks on these subjects in Chapter I.

The coast.—South-eastward of Jebel Umm Delfa or Slope hill, 7,165 feet high, in lat. $26^{\circ} 59' N.$, long. $33^{\circ} 30' E.$, the mountains forming the main coast range gradually decrease in height. They approach close to the shore in the neighbourhood of Safája island, and are from 2,000 to 4,000 feet high, having several well-defined peaks, which may be readily distinguished by the aid of the chart. From Safája to Kosier the hills are lower, and the conspicuous peaks more scattered. The shore between these places is low, rising gradually at about 5 or 6 miles inland, to mountains about 2,000 feet high.

Southward of the Jifatin islands, and as far as Koseir, the coast has a general S.S.E. direction and is moderately clear of dangers. Abreast of Safája island, there are outlying reefs $5\frac{1}{2}$ miles from the nearest land. From thence to the village and boat anchorage of Kúweh the shore is safe to approach. Near the village, at $3\frac{1}{2}$ miles from the nearest land, are the Kúweh reefs. From Kúweh to Koseir the shore is lined by a narrow fringe of reef in which occasional openings form good boat harbours.

SAAL HASHISH ISLAND, 10 feet high and 10 miles S.S.W. from Jifatin Seria, is very small and has a reef extending $1\frac{1}{2}$ miles southward of it. Abreast of the island, the coast forms the bay known as Mersa Abu Mokhadij running in to the north-west, which

Hashish and its reef serve to protect. There is a 7-fathoms channel between the reef and the mainland, but the western edge of the island reef has several outlying rocks. There are no outlying dangers eastward of the island.

Anchorage.—Between Dish tal Kora thaba, the eastern point of Mersa Abu Mokhadij, and Hashish, there is a deep channel about 7 cables wide, leading into an anchorage in from 15 to 20 fathoms, mud; but, when the wind is from the northward, by steaming slowly up to the reef off point Dish tal Kora thaba, shallower water may be obtained. Close to the edge of the reef last mentioned there are some detached rocks.

Another anchorage is southward of Saal Hashish reef in from 6 to 10 fathoms, sand and coral, with Hashish island bearing N. by E.

At $2\frac{1}{2}$ miles S.S.W. from Saal Hashish there is a small and well-protected bay, having deep water close to the shore reef.

RAS ABU SOMER, 80 feet high, is a gravel-topped hill, slightly higher than the neighbouring coast line, from which it projects $2\frac{1}{2}$ miles north-eastward and south-eastward, and is safe to approach. Between Abu Mokhadij and Abu Somer the shore is fringed by a narrow reef, which has deep water close to it, and with the exception of a small patch named Sherm ah Naggah, has no outlying dangers. The shore reef extends half a mile in a south-easterly direction from Ras Abu Somer.

Coral island is three-quarters of a mile distant in a south-west direction from Ras Abu Somer, and is a low coral islet only 4 feet high, surrounded by a reef, on the southern end of which is a small sandy islet.

North-westward of Coral island, the shore reef, with a small islet on it, extends one mile from the land, leaving a 4-fathoms channel a quarter of a mile wide. Between Coral island reef and Ras Abu Somer, there is a channel of the same depth but only $1\frac{1}{2}$ cables wide; at its entrance, near the edge of the reef projecting from Ras Abu Somer, there are two coral rocks nearly awash.

Fairway reefs.—At the entrance of the channel between Safāja and Coral islands are the Fairway reefs. There are passages to the northward, between, and southward of these reefs, but the northern channel is the best and the only one recommended.

Anchorage.—The best channel to the anchorage westward of Ras Abu Somer is between Coral and Fairway reefs, passing southward of the sandy islet on the former; then, taking care to avoid the mainland reef, haul up to the northward, westward of Coral island reef, and anchor in 7 fathoms with the island bearing S. $\frac{1}{4}$ W., and the south extreme of Ras Abu Somer E. by S. $\frac{1}{4}$ S. The least water in this channel is 4 fathoms, in the narrows north-westward of Coral island.

Anchorage with shelter from northerly winds may also be obtained in 8 fathoms, sand and coral, on a shelf extending 3 cables south-westward from Coral island.

SAFÁJA ISLAND, of which the highest part is in lat. $26^{\circ} 45\frac{3}{4}'$ N., is $4\frac{3}{4}$ miles long. in a S. by E. and N. by W. direction, and $1\frac{3}{4}$ miles wide at the northern part. The island is low and sandy; on its eastern side is a sandy-coloured table-hill 65 feet high. The eastern and western sides of Safája are fringed by a narrow reef, having deep water close to it. Off the northern end, a reef with several outlying patches extends $1\frac{1}{2}$ miles in a north-westerly direction. The channel between the island and the mainland narrows to a cable, and has only 2 fathoms water.

Outlying reefs.—From the table-hill, between the bearings E. by S. and S. by E. $\frac{1}{4}$ E., lie five dangerous coral reefs from $3\frac{1}{2}$ to $6\frac{1}{2}$ miles distant from the eastern side of Safája island; they are, Panorama reef, the northernmost; Middle reef, $2\frac{3}{4}$ miles south-eastward of the first; Shab Shear, the south-easternmost; Hyndman reefs, 2 miles westward of Shab Shear; and, Fellowes rocks, nearly 2 miles westward of Middle reef. Between and immediately outside these reefs there is deep navigable water. The outer part of Panorama reef bears E. by S. $\frac{1}{4}$ S. $4\frac{3}{4}$ miles from the table-hill of Safája.

Shab Shear, the outer and south-easternmost reef, bears S.E. $\frac{3}{4}$ S. $9\frac{1}{4}$ miles from the table-hill on Safája island, and is $5\frac{1}{2}$ miles distant from the nearest land.

Caution.—To avoid these reefs, passing vessels should not rise any part of Safája island above the horizon except the table-hill, which, in clear weather, is a good and prominent mark. Those seeking an anchorage will find a bearing of it a useful guide for clearing the reefs.

Spit reef.—The shore reef 4 miles southward of Safája island extends from the mainland in a N.N.E. direction nearly 3 miles, and is $1\frac{1}{2}$ miles wide. One part of the reef, a sand patch nearly 2 miles long, uncovers at low water. There is deep water on all sides of the Spit reef.

Cannon reef, $1\frac{1}{2}$ miles farther south-eastward, is a prong stretching nearly 2 miles to the northward from the shore. There is as much as 30 fathoms between it and the Spit reef, and much deeper water between it and Hyndman reefs.

Anchorage.—Safája island affords a sheltered anchorage for vessels approaching the strait of Jubal. There is good anchorage both northward and southward of it.

To enter the southern anchorage, steer W. $\frac{1}{2}$ S. for Safája table-hill, passing northward of Panorama reef, until within a mile of the shore; then alter course to the southward, running along the edge of the reef and

haul to the north-westward round the southern point of Safája island. Off the latter, there are some detached rocks 3 cables from the point in a southerly direction. Anchor in from 6 to 9 fathoms, sand and coral, on a bank of soundings connecting the island with the Spit reef, with the southern point of the island bearing S.E. by E. $\frac{1}{2}$ E. one mile; and Safája table-hill about N. by E. $\frac{1}{2}$ E.

Appearance of the land.—Jebel Umm Kabash, 2,735 feet high, rises close to the coast and marks the position of Safája island and reefs. It is readily distinguished, being at the southern end of the lofty main range. The most conspicuous of the neighbouring hills is Jebel Umm Betelshade, a sharp peak 1,980 feet high, 11 miles S.W. by S. from Safája, and 7 miles from the nearest point of the coast. Jebel Kúweh, in lat. $26^{\circ} 18' N.$ and $6\frac{1}{2}$ miles inland, is a prominent sugar-loaf peak, 1,600 feet high. It bears from the village of Kúweh and from the northern point of Kúweh reefs S.W. $\frac{3}{4}$ W.

Kúweh is a small Bedouin village and encampment in lat. $26^{\circ} 22' N.$, long. $34^{\circ} 8' E.$ The Arabs at this place are apparently of a wilder character than those met with on the coast more to the northward.

Boat harbour and landing-place.—At high water, there is an opening in the reef, half a mile southward of the village, through which a boat can approach the shore; but the best landing place is about a mile southward of the village, where there is a good boat harbour.

Kúweh reefs.—From 2 to $3\frac{1}{4}$ miles in an E.N.E. direction from Kúweh are several dangerous reefs, with soundings between them and the shore. From their southern extreme, Kúweh peak bears S.W. by W. $\frac{1}{2}$ W.

Anchorage.—Temporary anchorage may be obtained under the southern side of the innermost of the Kúweh reefs in about 6 fathoms.

KOSEIR.—The town of Koseir, in lat. $26^{\circ} 6' N.$, long. $34^{\circ} 17' E.$, containing about 3,000 inhabitants, is built on a low sandy point projecting a little from the line of coast, and forming a small bay, in which coasters obtain good holding ground and good shelter from northerly winds, whilst south-easterly winds are said not to blow home; but there is no harbour. An old Turkish fort occupies the higher ground, westward of the town. The houses of Koseir are built either of stone, sandstone, or chalk, obtained from the neighbouring hills; the streets are clean, regular, and at short intervals run at right angles to each other. These, however, are but the remains of a much greater prosperity than it now enjoys, for since the railroad from Cairo to Suez was completed, and since steamers began to run regularly from the latter port to Jidda and Sawákin, trade, with the exception of grain, has almost entirely left Koseir.

See chart, No. 86, with plan of Koseir.

In communicating with Egypt, the Keneh and Koseir route is now used to the Nile, distant 120 miles. Koseir is a coastguard station.

Supplies.—Water is condensed at Koseir at the rate of 30 tons a day; the tank will hold 200 tons, and 50 tons is the minimum stock. The price in 1894 was 13s. 6d. per ton, but was about to be reduced. Near the condenser there is a pier, with 5 feet at the end at high water. No supplies can be obtained at Koseir; fresh water for use in the town is brought from wells several miles inland.

Tides.—It is high water, full and change, at Koseir at 6 h.; the rise is 3 feet at springs.

Anchorage.—Besides the anchorage for small craft only, close in to the town, there is an indifferent anchorage on a small patch of soundings of from 15 to 17 fathoms, sand and coral, which bears East $1\frac{1}{2}$ miles from the fort. Between this bank and the point of the coast reef, there are depths of 45 fathoms.

There is also anchorage in 15 fathoms close off the point of the coast reef, which extends seaward about 3 cables.

There is no sheltered anchorage anywhere between Safāja island and Koseir.

DIRECTIONS.—The coast for 8 or 9 miles North and South of Koseir is very low, and a long line of hills from 700 to 1,000 feet high, 5 or 6 miles inland, presents no prominent mark to guide a ship towards the port, especially at night. The small Turkish fort westward of the town can be seen by a ship at sea 10 or 12 miles distant. Jebel Abu Tiyyur, 4,500 feet high, is the most conspicuous, and the highest mountain on this part of the coast; its north-western brow is the highest, and bears from the anchorage S.S.W., 24 miles. From the northward, this mountain shows in peaks. When bearing W.S.W., it appears flattened; bearing W.N.W. and N.W., the northern summits become rounded and the southern summits gradually appear as peaks. Being so far inland, Jebel Abu Tiyyur can seldom be seen by a ship at night.

In making Koseir, a sailing ship not certain of her latitude, should make the Brothers islets, and if north-westerly winds are blowing, she should stand in for the coast 7 or 8 miles northward of the port, and then bear up close along the shore. A sailing ship cannot be too careful not to get southward of the port; for it has frequently happened that a vessel making the land a few miles too far to the southward, has taken three or four days to beat back, the north-westerly winds causing a continuous drain of current and heavy swell along, and even some distance from, the shore. In such a case, a sailing vessel had better stand over to the Arabian side and make her nothing there, rather than make short tacks on the Egyptian side. A vessel making the port at night and not intending

See plan of Koseir anchorage, on chart, No. 86.

to anchor, should not heave to, but stand off and on, or she will drift to leeward.

The Coast.—From Koseir, the coast trends in a general S.S.E. $\frac{1}{2}$ E. direction 155 miles to Ras Benas, receding 10 miles from this line at Sherm Sheikh, which is 100 miles from Koseir.

Ras Abu Hajar.—Reef.—This cape, in lat. $25^{\circ} 58' N.$, bears S.S.E. $\frac{1}{2}$ E. nearly 11 miles from the town of Koseir. Off the cape is a reef, distant from the shore about $1\frac{1}{2}$ miles. It has estimated depths of from one to 3 fathoms, and has an apparent extent of about one mile in a N.N.W. and S.S.E. direction, with a breadth of about 3 cables; it lies with Ras Abu Hajar about S.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles. Jebel es Selle, a black hill shaped like a cone and standing among a number of low sand-hills about 3 miles inshore, is nearly in the same line of direction.

Mersa Toronbi.—At 28 miles S.S.E. from Koseir, in lat. $25^{\circ} 42' N.$, is this anchorage in 7 or 8 fathoms, a little sheltered from north-westerly winds by a low point of the mainland. Northward of the point are two small shoals close inshore, with soundings of 17 and 20 fathoms near them, as well as for 3 miles eastward and north-eastward of them.

Cats' Ears.—W. $\frac{3}{4}$ S. 10 or 11 miles from Mersa Toronbi is the Cats' Ears hill, with three round well-defined heads. The range extends towards the south-west and rises in height near Cap hill; *see* view on chart.

Ras Hamrhu is a bluff red cape 10 miles S.S.E. of Mersa Toronbi. The shore in this vicinity is steep-to.

Mersa ma Mubarak, 4 miles south-eastward of Ras Hamrhu, is a good anchorage in a small bay between two reefs, in lat. $25^{\circ} 30' N.$, with 6 and 7 fathoms water inside. A good look-out from aloft is necessary in anchoring, to avoid a sunken rock in the middle of the bay.

Mersa Dhiba is a small cove in the here tolerably level sandy shore, W. by N. $\frac{1}{2}$ N. $5\frac{1}{2}$ miles from the Elphinstone reef, which affords good anchorage in 16 fathoms in westerly winds. Westward of Mersa Dhiba, near the shore, is Jebel Rosás, 115 feet in height, a single and prominent peak, with many shoulders.

ELPHINSTONE REEF, in lat. $25^{\circ} 19' N.$, is $5\frac{1}{2}$ miles off-shore and has deep water all around; but, between it and Mersa Dhiba are several dangerous shoals and rocks, having from 10 to 14 fathoms between and amongst them.

Ras Egela, $5\frac{1}{2}$ miles S.S.E. of Mersa Dhiba, is a light-brown double hill and forms a distinctly visible landmark.

See chart, No. 8b.

Mersa Zebara.—Anchorage will be found in this small narrow cove in lat. $25^{\circ} 11\frac{1}{2}'$ N.; the entrance is not more than 100 yards wide, but it is perfectly sheltered.

Anchorage.—In lat. $25^{\circ} 4'$ N. there is a reef $2\frac{1}{2}$ miles from the shore, on the southern extreme of which a ship may anchor in from 10 to 18 fathoms, well sheltered from north-westerly winds.

Mersa Tundeba is an anchorage close inshore where a vessel may anchor in 10 fathoms, under shelter of a low point with a small reef projecting from it. E. by N. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from this anchorage, there is a small reef with anchorage on its south-eastern side. This reef is at the northern extreme of a bank of soundings about a mile in extent, with deep water all round it. There is a dangerous rock $1\frac{1}{2}$ miles S.W. $\frac{1}{4}$ W. from its southern extreme.

Westward of Mersa Tundeba rises Jebel Zebara, a little above the mountain range. On this hill are remains of ancient structures, emerald and beryl mines, and abandoned quarries.

Ras Dhurra is a low point of the mainland with a long reef running parallel with and close to it. Five miles N. by E. from this cape is the small reef, and 3 miles distant in the same direction the dangerous rock just now mentioned; there are besides several other detached rocks lying eastward and south-eastward of Ras Dhurra from 5 to $8\frac{1}{2}$ miles distant; this part is dangerous for ships, the deep water running close up to the shoals.

Wadi Nukeri, just northward of Ras Dhurra, and in lat. $24^{\circ} 55'$ N., is a small boat harbour. On the low hillocks near the shore are the remains of the town of Nechesias, consisting of two great rectangular blocks. The adjacent country is barren, and is inhabited by the Abahdeh tribe.

WADI JEMAL is a low rocky island, $2\frac{1}{2}$ miles in length north-west and south-east, its centre in lat. $24^{\circ} 39\frac{1}{2}'$ N. The extensive coral reef Shab Ghadera is off its northern end. The channel between the island and the main is dangerous, being full of small reefs and patches of rocks.

Anchorage.—Off the southern point of the island, there is a spit of shoal water on which a vessel may anchor in 8 or 10 fathoms, sand and rock, with the centre of the island bearing about North.

Dangers.—E. $\frac{1}{2}$ N. 4 or 5 miles from Wadi Jemal island, is a dangerous sunken rock, and another northward of the island about the same distance. A little farther northward, with the island bearing S. by W. 7 miles, there is a small shoal in lat. $24^{\circ} 46\frac{1}{2}'$ N. These outer shoals have deep water close to all round them.

Caution.—When within 15 miles of the land, the shore about this part ought to be approached with great caution.

SHERM SHEIKH.—Four miles south-westward of the southern point of Wadi Jemal island, is a cove in the mainland, the entrance to which is through an opening in the coast coral reef about 100 yards wide; there is good anchorage inside in a depth of 8 fathoms. In the bottom of the bay the shore is flat and sandy, but at about one mile inland a chain of hills runs parallel to the shore, rising to an elevation of 492 feet, upon which, at about half their height, there is a great white patch forming an excellent mark, distinctly apparent from the direction of Wadi Jemal, showing under a table-topped elevation. Wood can be procured here close to the anchorage.

Ras Umm-ul-Abbas, in lat. $24^{\circ} 33' N.$, is a low point, southward of which, and under its lee, is an indifferent anchorage close to the shore, in 10 fathoms, affording good shelter from north-westerly winds. It bears about S. by W. 6 miles from the eastern end of Wadi Jemal, and may be easily known by a remarkable sugar-loaf hill 300 or 400 feet high and close to the beach.

Small reef.—In lat. $24^{\circ} 29' N.$ is this reef, with several sunken rocks near it, spread over a space $3\frac{1}{2}$ miles in extent; the principal reef is nearly $5\frac{1}{2}$ miles from the shore and the outlying rocks on the southern side are but little more than 2 miles from the northern extreme of the Gulhan island reefs; there are overfalls between the patches of rocks, from depths of 14 to 30 fathoms.

Jebel Wadi Lehama, 22 miles W. by S. $\frac{1}{4}$ S. from South island of the Gulhan group, is about 6,300 feet high and a remarkable mountain, whose peak is sometimes visible in clear weather 90 or 100 miles distant, and is frequently seen by vessels passing up the centre of the Red sea; *see* view on chart.

GULHAN ISLANDS.—Mehabis, or South island, is the southernmost of this group of four low sandy islands, situated near the mainland, and forming a chain nearly 5 miles long in a general north and south direction. South island is in lat. $24^{\circ} 19' N.$, and is about one mile distant from the mainland at Ras Gulhan, to which it is joined, or nearly so, by an extensive reef. Siyul or North island is the northernmost of the group, and reefs extend fully 3 miles N.N.W. from it. The other two islands lie between these two, but eastward of a line joining them.

These islands are surrounded by extensive reefs with narrow passages between them studded with rocks. Along the outer or eastern edge of the reefs there is no bottom at 30 fathoms close to the rocks.

See plan, No. 3,047, and chart, No. 85.

There are two small reefs south-eastward of South island and about a mile distant from it, and also two small patches E. by S. $\frac{1}{2}$ S. about 3 miles, as well as many others between 5 and 12 miles distant in a south-easterly direction.

Anchorage.—Southward of the Gulhan islands, a vessel may anchor in 8 or 10 fathoms water near South island.

Mersa Wadi Lehama, W.N.W. of Fury shoal and on the mainland 24 miles north-westward of Ras Benas, is a good anchorage in 7 or 8 fathoms under the lee of a low point, off which a narrow reef projects to the southward; the anchorage is between the reef and the shore.

Off-lying rocks.—E. by N. $\frac{1}{2}$ N. from this anchorage, from 6 to 9 miles distant, in lat. $24^{\circ} 13' N.$, there is a chain of small reefs with no soundings close to them; and 9 or 10 miles to the north-eastward is another cluster, with numerous detached rocks between them. These rocks are all part of the scattered group of which the Fury shoal is the south-eastern extreme.

Between Mersa Wadi Lehama and Reef point, about 11 miles north-westward of the latter and very near the shore, is a reef about one mile in extent N.N.W. and S.S.E. by 2 cables wide.

Reef point, N.W. by W. $\frac{1}{4}$ W. about 6 miles from Ras Benas, has off it several small reefs, the nearest distant little more than a mile from the point; two of the reefs show above water, and are presently described in connection with Ras Benas; one is about $2\frac{1}{2}$ miles northward of Reef point; the other 4 miles eastward of it, and about $1\frac{1}{2}$ miles from the shore. The land near Reef point forms a bay with very deep water, there being no soundings near the shore.

FURY SHOAL.—At 13 miles N.N.W. from Ras Benas, and 7 miles off-shore, is this large reef, with several smaller ones on its north-western side, the outer reef being distant from the shore about 9 miles. There is indifferent anchorage in 6 or 7 fathoms, rock, on the southern part of the Fury shoal, but it is very bad holding ground and difficult to approach, the vicinity being studded with small rocks.

From abreast of the Fury shoal to 5 miles off Koseir a N.N.W. $\frac{1}{4}$ W. course leads outside all the dangers which in this part lie within a few miles of the shore.

RAS BENAS.—The body of this cape, on which are some moderately high hills, lies in lat. $23^{\circ} 56' N.$, and its outer extreme is a low sandy point running out to the south-eastward. On the eastern side of the cape there is no bottom at 30 fathoms close to the shore; on the western side, an extensive reef runs off westward and southward, almost to the parallel

See chart, No. 86.

of Mukawar island, its southern edge bearing from the South extreme of that island W.N.W.; off the extreme point of the reef are numerous small reefs and rocks, with irregular soundings between them of from 8 to 30 fathoms. The channel between this shore reef and Mukawar island is $1\frac{1}{2}$ miles wide.

Cygnets rock.—This rock, discovered by H.M.S. *Cygnets* in 1886 is a small coral shoal only a few yards in circumference, and has, apparently less than a fathom water on it, with deep water all round. It is about one mile from the shore and 3 miles westward of the shore reef of Ras Benas, just described; its position, however, as charted, is only approximately correct.

When the Bodkin, a remarkable sharp peak 4,036 feet high, in the mountains of Berenice, begins to shut in with the double-topped mountains southward of the highest peak of this range, a sharp look-out should be kept for this rock, on which the sea does not break.

Out-lying reefs.—A reef, before mentioned in describing Reef point, lies in lat. $24^{\circ} 0' N.$ (approximate), with the eastern extreme of Ras Benas and Mukawar island in line; it is about $7\frac{1}{2}$ cables in extent N.N.E. and S.S.W. by half a cable in width; and, at its northern end, has coral heads showing above water.

Another reef, about 5 cables in length north and south by half a cable wide, lies N.W. by W. about 5 miles from the last described reef; it also has coral heads showing above water.

MUKAWAR or EMERALD ISLAND, distant nearly 3 miles S. by E. from the low sandy point at Ras Benas, is a mile in length and about 100 feet high at its southern end; when viewed on a south-westerly bearing, it has the appearance of an inclined plane. The island is a mass of coral and affords no anchorage, there being very deep water close to the coral reef by which it is fringed on all sides, and which, off the north-western end, extends half a mile from the island. From Mukawar, St. John's island bears S.E. $\frac{1}{2}$ E. 23 miles.

ANCHORAGES.—Horse-shoe reef.—There is anchorage on the southern side of the Horse-shoe reef, which reef is about $1\frac{1}{2}$ miles S.S.W. from Mukawar island, and is about 3 miles long north-west and south-east, and is on the northern edge of a nearly circular bank of soundings 2 miles in diameter; the southern edge of the reef is awash and steep-to.

Anchorage may also be found on the reef on which White rock, shaped like a boat, and 7 or 8 miles south-westward of the Horse-shoe reef, is situated, but it is not good. Another similar anchorage is afforded by a shoal and rocky bank, lying S.S.E. of White rock in lat. $23^{\circ} 34' N.$; this, however, must be approached with caution, for H.M.S. *Dolphin* grounded

here in 1894 on a coral pinnacle. Fairly good anchorage may be found southward of a horse-shoe shaped reef in lat. $23^{\circ} 28' N.$, long. $35^{\circ} 44' E.$

Ras Benas bay.—A vessel desirous of anchoring in this bay and coming in through the channel between Ras Benas shore reef and Mukawar island must be cautious not to come too close to the sunken rocks and reefs off the cape until she is in deep water; she may then haul up for the anchorage at the head of the bay, skirting the reef, and anchor in about 10 or 12 fathoms about one mile from the shore, well sheltered from all winds, with the low sandy southern point of Ras Benas bearing about S.E. $3\frac{1}{4}$ miles. In working up, a sailing vessel should take care not to come too near the low, sandy, and somewhat bushy cape, on account of the numerous rocks near it.*

PORT BERENICE.—About 16 miles W. by N. from the low southern point of Ras Benas, and 12 miles westward of the anchorage just described in Ras Benas bay, is the entrance to this port, formed in the north-western angle of the deep bight sheltered by the promontory of Ras Benas. The port is protected on the eastern side by a long sand-spit above water, which, on entering, appears to form part of the northern beach of the harbour. From the southward, it is protected by the reefs of Foul bay.

On the western shore, near the anchorage, are some ancient Egyptian ruins nearly covered with sand, the remains of the ancient city of Berenice, once a place of considerable importance; the landing-place for these ruins will be recognised by two hillocks about 30 feet high, which rise close to the sea at the termination of a low conspicuous point of dark-coloured rocks. The small bays or coves which gave shelter to the traders of ancient Berenice are entirely closed by sand, except the northern one, which is only 270 yards wide at the entrance but has from 10 to 6 fathoms water.

Shoals.—A large reef, the northernmost in Foul bay, lies 3 miles S.W. by S. from Philadelphus point, and from thence extends westward to the shore.

A shoal of 2 fathoms and of small extent, lies S. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles from the south-western extreme of the sand-spit.

The seaward side of the sand-spit is bordered by shoal water extending 5 cables from it. On its western side is extensive anchorage ground in about 14 fathoms, mud, sand, and coral; but here, owing to the strong

* H.M.S. *Cygnet* reported, in 1886, that it seemed somewhat dangerous to attempt reaching the anchorage here described, discoloured water appearing to surround it. She anchored a little farther westward, on a small patch in 12 fathoms, half a mile from the shore, with Mukawar island bearing S.E. about 7 miles. With $5\frac{1}{2}$ shackles of cable out, the ship swung into 23 fathoms, but the anchor held well though the wind was off-shore, and the force from 5 to 7.

See chart, No. 8b, and plan, No. 14.

N.N.W. winds so prevalent during the day time, there is often a very troublesome sea for boats.

At the head of the harbour are two coves, approached by a narrow channel with a least depth of 6 fathoms, between the eastern shore reef and some 3-fathoms patches. The best anchorage is in about 7 fathoms at the mouth of North cove; here the water is always smooth with the prevailing wind.

The entrance to the inner harbour is on the eastern side, off the entrance to North cove: it is an intricate narrow passage through the shoals, almost blocked by reefs; its shores are very low and flat.

The shores of the port, generally, consist of a low sandy plain, rising gently to the hills 5 or 6 miles distant, and dotted here and there by hillocks of drift sand. When surveyed in the summer of 1884, dry beds of mountain torrents were observed but no water or wells near the shore, nor at ancient Berenice. There are wells, however, at the villages at the foot of the hills, and fishermen obtain water at a place about 5 miles southward of the port. A convenient landing-place will be found on the north-western side of North cove.

Supplies.—A few sheep and fish may occasionally be obtained here, but there is no village nor any permanent population, the supply depending entirely on the chance of finding a few wandering fishermen plying their trade.

Climate.—The officers of H.M.S. *Myrmidon*, during the survey of this port in August 1884, reported the air to be fresh and cool. The wind generally blew hard from about N.N.W. from 9 h. a.m. to about 5 h. p.m., but fell light during the night.

Directions.—In approaching port Berenice, either of the two channels south-westward of Mukawar is better than that northward of the island. If the channel between Mukawar and the Horse-shoe reef is taken, care is required, after passing the island, not to bring its southern cliff southward of E. by S. $\frac{1}{2}$ S. until at least 5 miles of westing has been made, in order to clear the south-western extreme of Ras Benas shore reef.

If passing southward of the Horse-shoe reef, which, being awash and steep-to at its southern end, is easily seen, make one mile of westing.

In either case, after sufficient westing is made, steer for Philadelphia point, a yellow cliffy point under a remarkable double summit, carefully avoiding the Cygnet rock. Approach the point to half a mile, and then alter course to West for the end of the sand-spit, which give a berth of 3 cables in rounding, and anchor in about 14 fathoms, with the spit end bearing E. by S. about 5 cables.

If proceeding to the inner anchorage in North cove, vessels of 16 feet draught should keep over towards the main reef on the starboard hand,

the shoalest parts of which show when the sun is high enough, in order to clear the 3-fathoms patches lying in the way. Vessels of more than 16 feet draught should buoy these patches before attempting the passage.

A vessel making for port Berenice from the anchorage in Ras Benas bay, must beware of the Cygnet rock as it lies exactly in the line of route.

The COAST.—From Berenice, the coast to the southward continues low, rocky, and intersected by several lagoons having their entrances blocked by sand. About 7 miles from the beach are the Berenice mountains, a narrow range attaining an extreme height of 4,440 feet. A plain drift of sand extends from their base to the sea, and they are broken into many varieties of shape, mostly terminating in sharp rugged points. To one of the highest, which is so narrow that it bears some resemblance to a column, the name of the Bodkin has been applied. Its remarkable appearance makes it easy of recognition, and a useful landmark. There are no uplands in the vicinity equal in height or similar in appearance to this range.

Southward of the Berenice range, there is nothing in the low rocky coast peculiar or striking until we approach the mountain masses of Jebel Elba, about 8,000 feet high, whose peaks are seldom free from clouds. They can always be seen by ships passing through the middle of the Red sea, if the weather be clear.

FOUL BAY, the southern part of which lies westward of St. John's island, and north-westward of Shab Abu Fendera, is full of reefs and sunken rocks. A line drawn N.W. from Shab Abu Fendera clears the outer boundary of the reefs to the north-west until this line is crossed by another drawn S.W. $\frac{1}{4}$ W. from the south-eastern extreme of St. John's island. This last line leads south-eastward of the outer reefs.

The shores also throughout this space are thickly studded with reefs, Lieut. Wellsted, Indian navy, from whose valuable observations we so often quote, remarks respecting them :—"So little inducement exists for approaching its barren and rocky shores that we were unable to obtain a pilot at Jidda or Koseir who possessed any knowledge of them. The conclusion of an arduous and dangerous survey has enabled me to pronounce that within the boundary traced in the chart the space is filled with such a labyrinth of shoals and reefs, that our knowledge of them can serve no other purpose than to warn vessels from invading its limits."

ST. JOHN'S or ZEBERJED ISLAND, in lat. $23^{\circ} 36'$ N. and long. $36^{\circ} 10'$ E., is circular, about $1\frac{1}{2}$ miles in diameter, and about 700 feet high; the hill in the centre is a remarkable sharp peak of volcanic origin. St. John's was formerly famous for its emeralds; in 1840, it was the abode of one or two fishermen only, who were on the

See chart, No. 8b.

look-out for turtle which are very numerous hereabouts and valuable for their shell. From the north-eastern point of the island, Ras Benas bears N.W. $\frac{1}{8}$ N. 30 miles. The island is barren and affords neither water nor vegetable produce. It is steep-to on all sides, having no soundings near the band of coral reef, about 2 cables wide, which surrounds it or rather, forms its base, and often renders the island inaccessible.

Rocky island.—Three miles south-eastward of St. John's is this small steep rocky island, with no soundings near it.

St. John's reef lies S.W. $\frac{1}{4}$ W., 14 miles from the peak of the island; many others lie westward and south-westward of this outer reef, but none south-eastward of the latter direction. A line drawn N. by W. $\frac{1}{2}$ W. from St. John's reef to Ras Benas clears to the eastward by 3 or 4 miles the outer reefs in the northern part of Foul bay.

Mírear, a low sandy islet in lat. $23^{\circ} 11' N.$, is amongst a labyrinth of reefs extending in a north-west and south-east direction for about 25 miles. Near the eastern side of this cluster is a reef about 10 miles long, under which there is anchorage, south-eastward of Mírear. There is also good anchorage about 5 miles northward of Mírear, on the south-western side of a cluster of reefs.

Mersa Shab, the entrance of which is in lat. $22^{\circ} 50' N.$, is an extensive inlet almost blocked up by the coast reef and inaccessible to ships. Close outside the harbour, indifferent anchorage for a small vessel may be found. The extremes of the reefs off Mersa Shab as shown on the charts must only be considered as approximately correct. A black conical hill about 8 miles inland on with a single tree close to the beach S.W. leads between the outer reefs, but the position of these reefs is only approximately ascertained.

From Mersa Shab to Abu Dara, a low point covered with bushes, the shore is skirted by a reef, and fronted by numerous reefs and shoal patches, of which the northernmost is in lat. $22^{\circ} 59' N.$, long. $36^{\circ} 5' E.$, and 8 miles N.W. $\frac{3}{4}$ W. from the western extreme of Shab Abu Fendera.

SHAB ABU FENDERA.—S. $\frac{1}{4}$ E. $41\frac{1}{2}$ miles from St. John's island, and N.E. $\frac{1}{2}$ N. $7\frac{1}{2}$ miles from the eastern extreme of the largest Siyal island, is the eastern and outer extreme of this reef, 4 miles long from east to west, and the outer reef off this part of the coast, it being distant 17 miles from Abu Dara, the nearest part of the mainland. There is a small rock about 20 feet high at its eastern extreme, probably the remains of an island. It has anchorage on its southern side, but the bottom is studded with numerous small patches of rocks.

the shoalest parts of which show when the sun is high enough, in order to clear the 3-fathoms patches lying in the way. Vessels of more than 16 feet draught should buoy these patches before attempting the passage.

A vessel making for port Berenice from the anchorage in Ras Benas bay, must beware of the Cygnet rock as it lies exactly in the line of route.

The COAST.—From Berenice, the coast to the southward continues low, rocky, and intersected by several lagoons having their entrances blocked by sand. About 7 miles from the beach are the Berenice mountains, a narrow range attaining an extreme height of 4,440 feet. A plain drift of sand extends from their base to the sea, and they are broken into many varieties of shape, mostly terminating in sharp rugged points. To one of the highest, which is so narrow that it bears some resemblance to a column, the name of the Bodkin has been applied. Its remarkable appearance makes it easy of recognition, and a useful landmark. There are no uplands in the vicinity equal in height or similar in appearance to this range.

Southward of the Berenice range, there is nothing in the low rocky coast peculiar or striking until we approach the mountain masses of Jebel Elba, about 8,000 feet high, whose peaks are seldom free from clouds. They can always be seen by ships passing through the middle of the Red sea, if the weather be clear.

FOUL BAY, the southern part of which lies westward of St. John's island, and north-westward of Shab Abu Fendera, is full of reefs and sunken rocks. A line drawn N.W. from Shab Abu Fendera clears the outer boundary of the reefs to the north-west until this line is crossed by another drawn S.W. $\frac{1}{4}$ W. from the south-eastern extreme of St. John's island. This last line leads south-eastward of the outer reefs.

The shores also throughout this space are thickly studded with reefs, Lieut. Wellsted, Indian navy, from whose valuable observations we so often quote, remarks respecting them:—"So little inducement exists for approaching its barren and rocky shores that we were unable to obtain a pilot at Jidda or Koseir who possessed any knowledge of them. The conclusion of an arduous and dangerous survey has enabled me to pronounce that within the boundary traced in the chart the space is filled with such a labyrinth of shoals and reefs, that our knowledge of them can serve no other purpose than to warn vessels from invading its limits."

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See chart, No. 8b.

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Rocky island.—Three miles south-eastward of St. John's is this small steep rocky island, with no soundings near it.

St. John's reef lies S.W. $\frac{1}{4}$ W., 14 miles from the peak of the island; many others lie westward and south-westward of this outer reef, but none south-eastward of the latter direction. A line drawn N. by W. $\frac{1}{2}$ W. from St. John's reef to Ras Benas clears to the eastward by 3 or 4 miles the outer reefs in the northern part of Foul bay.

Mirear, a low sandy islet in lat. $23^{\circ} 11'$ N., is amongst a labyrinth of reefs extending in a north-west and south-east direction for about 25 miles. Near the eastern side of this cluster is a reef about 10 miles long, under which there is anchorage, south-eastward of Mirear. There is also good anchorage about 5 miles northward of Mirear, on the south-western side of a cluster of reefs.

Mersa Shab, the entrance of which is in lat. $22^{\circ} 50'$ N., is an extensive inlet almost blocked up by the coast reef and inaccessible to ships. Close outside the harbour, indifferent anchorage for a small vessel may be found. The extremes of the reefs off Mersa Shab as shown on the charts must only be considered as approximately correct. A black conical hill about 8 miles inland on with a single tree close to the beach S.W. leads between the outer reefs, but the position of these reefs is only approximately ascertained.

From Mersa Shab to Abu Dara, a low point covered with bushes, the shore is skirted by a reef, and fronted by numerous reefs and shoal patches, of which the northernmost is in lat. $22^{\circ} 59'$ N., long. $36^{\circ} 5'$ E., and 8 miles N.W. $\frac{3}{4}$ W. from the western extreme of Shab Abu Fendera.

SHAB ABU FENDERA.—S. $\frac{1}{4}$ E. $41\frac{1}{2}$ miles from St. John's island, and N.E. $\frac{1}{2}$ N. $7\frac{1}{2}$ miles from the eastern extreme of the largest Siyal island, is the eastern and outer extreme of this reef, 4 miles long from east to west, and the outer reef off this part of the coast, it being distant 17 miles from Abu Dara, the nearest part of the mainland. There is a small rock about 20 feet high at its eastern extreme, probably the remains of an island. It has anchorage on its southern side, but the bottom is studded with numerous small patches of rocks.

Siyal islands are three in number; about 8 feet above the level of the sea, sandy, and partly covered with bushes. They are between 7 and 9 miles north-eastward from the low bushy point of Abu Dara, the nearest part of the coast, and surrounded by numerous rocks and reefs, the whole space between them and the shore being filled by reefs with such intricate passages among them, that their navigation is practically barred, and should not be attempted except by boats.* The eastern Siyal island is the largest, being about 2 miles long east and west; it is in lat. $22^{\circ} 47\frac{1}{2}'$ N., and is seen at times from the large reef of Abu Fendera. These islands are the residence of numerous fishermen of the Huteimi tribe.

The Coast from Abu Dara trends south-eastward 34 miles to Ras Jazriyal, and to seaward is studded with innumerable rocks.

Elba island, a small low coral island 5 miles off-shore, S.S.E. $\frac{3}{4}$ E. 28 miles from Siyal island, is on the body of the extensive reefs by which it is surrounded. Anchorage may be found on some spots or breaks in this reef, but sunken rocks are numerous about it.

Sherm Aluêda is an anchorage formed by the shore reef, $1\frac{1}{2}$ miles south-eastward of Ras Abu Fatima and 6 miles westward of Elba island; the entrance to it is very narrow and the shelter excellent, but it is available for nothing larger than dhows.

Ras Jazriyal is a coral cliff cape of moderate height in lat. $22^{\circ} 17'$ N. and 10 miles S.E. $\frac{1}{4}$ S. from Elba island. The cape is fronted by an islet on its north-western side, with outlying reefs beyond.

MERSA HALAIB is an excellent harbour close to the southward of Ras Jazriyal, but, for sailing vessels, it is difficult of access when north-westerly winds are blowing, the entrance channel running north and south.

The harbour is formed by the reef extending $5\frac{1}{2}$ cables southward from Sea point, which has a rock 2 feet above water on the northern side of a small indentation at its outer edge, and a sandy islet just awash half way between the point and the southern extreme of the reef; and by a long barrier reef leaving the southern shore $2\frac{1}{2}$ miles from Sea point and extending $2\frac{1}{2}$ miles in a N.N.W. $\frac{3}{4}$ W. direction and terminating in N.W. rock.

Entrance.—The shoal extending from Sea point, which has several rocky heads just showing above water, overlaps the barrier reef, leaving

* In 1884, Commander Carpenter, H.M.S. *Myrmidon*, passed between the Siyal islands and Abu Dara. He says :—"I conceived there was a passage with care through the reefs off Abu Dara, but soon found myself in a net-work of shoals and reefs from which it seemed there was no outlet. After *two days'* careful guiding from aloft, with a boat ahead, and with most favourable weather, I got through, the shoalest water passed over being 21 feet."

See charts, Nos. 86 and 8c; also plan, No. 14.

an entrance channel eastward of the reef less than one cable wide, with depths of from 7 to 14 fathoms.

When within the entrance, the harbour opens out into two good anchorages northward and southward of the entrance, with depths of from 14 to 5 fathoms. The shores of the harbour are fringed with reefs from 2 to 3 cables wide, with some detached rocks, from which, however, the northern shore appears to be free.

A fort with a small flagstaff stands about 40 yards from the shore and 8 cables southward of Gable point, and a blockhouse on the rising ground about 500 yards inland from the port; these are good marks for the southern anchorage, and also for making the place from seaward. There is a considerable village extending along the shore on each side of the fort, off which there is a coral pier built out to the edge of the reef.

A patch of 5 fathoms lies one cable N.W. $\frac{1}{4}$ N. from N.W. rock, one of 3 fathoms (possibly less), $1\frac{1}{2}$ cables North of it, and another of $4\frac{1}{2}$ fathoms 2 cables N. $\frac{1}{2}$ E. of the same rock. There is a canoe channel through the neck of the peninsula of Mersa Halaib, and a boat passage through the barrier reef near the point where it leaves the shore.

Supplies.—Good water is to be procured near the South anchorage, at some wells in the vicinity of the fort and blockhouse before described, about 500 yards from the beach; firewood is scarce. Sheep can be obtained at reasonable prices, but a day's notice is required, the herds being in the hills. A plentiful supply of good fish may be had with the seine, just to the northward of the village. Grouse can be shot in the neighbourhood of the wells.

Directions.—The 2-foot rock on the spit near Sea point is a useful mark in approaching the Mersa; when close to the entrance the eye becomes the only guide, and it is therefore necessary that the sun should be in a favourable position either in entering or leaving; the reefs on the sandy islet side should be kept on board as they are more easily seen than those on the other side. No vessel, however, of any length should attempt to enter without first buoying the extremes of both reefs. A vessel proceeding to the South anchorage must be very cautious in rounding the N.W. rock, in order to clear the shoals extending northward from it.

Caution.—In 1889, H.M.S. *Scout* reported passing a shoal about 3 miles off the entrance of Mersa Halaib, in approximate lat. $22^{\circ} 15\frac{1}{4}'$ N., with estimated depths of from 3 to 4 fathoms. H.M.S. *Albacore*, in passing within half a mile of the spot indicated, reported that with a look-out aloft no sign of shoal water could be seen in this locality; until the existence or non-existence of this shoal is determined, great care should be exercised in approaching this Mersa.

CAPE ELBA, so called from its being the terminating point of the Elba mountains, is in lat. $22^{\circ} 3' 30''$ N., long. $36^{\circ} 52'$ E. These mountains are very remarkable, and are almost always seen by ships passing up or down the centre of the sea. (*See view A on chart.*)

Elba reef is 3 miles in extent north-west and south-east; from its north-western point, cape Elba bears W. by N. $\frac{3}{4}$ N. $6\frac{3}{4}$ miles.

Mersa Bela.—Between the Elba reef and the shore is a mass of reefs, amongst which, however, anchorage may be found, and there is a clear passage down the coast in-shore of them. Abreast of their south-western end is the entrance to Mersa Bela, $4\frac{1}{2}$ miles south-westward of cape Elba. In this small cove, there is just room for a gunboat, with a very short scope of cable out; the anchor being let go in $5\frac{1}{2}$ fathoms, stiff mud, she will swing towards the head of the Khor in 15 feet over coral rocks.

OUTER DANGERS.—A line drawn between Shab Abu Fendera and the outer reef off cape Elba just touches the outer reefs between those two points, extending and detached from the shore. Their positions are as follows :—One small reef in lat. $22^{\circ} 10'$ N., 2 miles westward of the line and the same distance from the shore; another small reef lies half way between this reef and cape Elba and $1\frac{1}{2}$ miles from the shore. In lat. $22^{\circ} 15' 30''$ N., one mile westward of the line and $5\frac{1}{2}$ miles from the shore, are two small reefs. In lat. $22^{\circ} 35' 30''$ N., just on the line, is the outer reef of a group on a bank of soundings extending north-westward 20 miles as far as the Siyal islands. These reefs are very dangerous, having numbers of detached rocks about them. A small vessel in want of anchorage may, however, find shelter under most of them.

At 36 miles S. $\frac{1}{2}$ E. from the Elba reef, in lat. $21^{\circ} 24' 30''$ N., long. $37^{\circ} 8'$ E., is the dangerous outer reef $5\frac{1}{2}$ miles north-eastward of the entrance to Khor Shinab. This line, S. $\frac{1}{2}$ E. and N. $\frac{1}{2}$ W., has all the reefs on its in-shore side, except in lat. $21^{\circ} 39'$ N., where a reef lies 2 miles outside it, and many others between it and the shore, whilst others whose positions are not known, are reported as lying farther to the southward.

Anchorage.—Between cape Elba and Khor Shinab, the shore is fringed with reefs, except where breaks give access to the many inlets on the coast, most of which afford good anchorage, care being taken to avoid the numerous detached reefs lying 3 or 4 miles, and even farther from the shore; under many of which reefs, anchorage is also to be found, the eye being the only guide. Some of these reefs are several miles in extent, especially that fronting the coast between Khor Delaweb and Sherm Abu Amara Farat, which occupies a space $6\frac{1}{2}$ miles long by $3\frac{1}{2}$ miles wide.

See chart, No. 8c.

Khor al Maarúb, in lat. $21^{\circ} 52'$ N., has the appearance of a roomy anchorage but has not been examined.

Eeles cove, about $3\frac{1}{2}$ miles southward of the last-named Khor, runs in between the reefs about 7 cables in a N.W. by W. direction, where a small bay is formed, and then turns W.S.W. 4 cables to a bay at the inner end of the cove. The channel is only about 130 yards wide with depths of from 13 to 10 fathoms as far as the first bay, and from 10 to 7 fathoms between that and the inner bay. The reefs project $3\frac{1}{2}$ cables from the shore at the entrance points.

Anchorage may be found in either bay,—in the outer one in 10 fathoms, and in the inner one in 7 or 8 fathoms, but there is hardly swinging room, each bay having only about a diameter of $1\frac{1}{4}$ cables clear of the reefs.

About 2 miles southward of Elees cove is another and larger inlet; its outer northern point is low and sandy, the coast reef extending about 3 cables from it; the southern point is of coral rock 5 or 6 feet high, and the reef extends rather farther from it than on the other side. There are 12 and 13 fathoms in the entrance, decreasing to about 10 fathoms at the head, where the harbour spreads out into three arms or bays, and there is room here for a vessel to lie at single anchor by taking a central position. The entrance is in a W. by N. $\frac{1}{2}$ N. direction.

Khor Abu Fanadir in lat. $21^{\circ} 42' 30''$ N., and Khor Delaweb, 6 miles farther southward, are inlets very similar in character to those just described; in each, the entrance appears to be clear of danger, though narrow between the reefs; and, in each, near the head, there is anchorage with swinging room for one moderate sized vessel.

Abu Hamama is a table-topped hill in lat. $21^{\circ} 29\frac{1}{2}'$ N., and near the coast; it is one of a low range which continues from thence southward and terminates in small straggling hummocks a little southward of Khor Shinab. Haycock peak, in lat. $21^{\circ} 19'$ N., is the southernmost but one in this range.

Sherm Abu Amara Farat.—In approaching this inlet from seaward, the hill Abu Hamama, rising close to its head, is a good mark both for clearing the shoals outside and for leading up to the entrance between the shore reefs, which extend nearly half a mile from the respective points. The channel is at first $2\frac{1}{4}$ cables wide, with from 15 to 13 fathoms, in a W. $\frac{1}{2}$ N. direction, afterwards diminishing to one cable in width and turning to the south-westward; in this part, the centre of the channel is occupied by the Middle shoal with as little as one foot water, beyond which is a roomy inner anchorage about 3 cable wide, with from 8 to 10 fathoms, mud and coral. The most convenient anchorage, however, is before reaching the Middle shoal, abreast of North bay, in 12 fathoms, and with a clear width between the shoals of 2 cables.

See chart, No. 8c, and plan, No. 1,109.

hemmed by shoals, but has a large stretch of open water in the deep bay on its western side. When approaching Ras Raweiya on a W.S.W. bearing, the bluff makes as an island, which might be mistaken for Makwar island, but the absence of out-lying islands should correct this error. On a closer approach, the low connecting coast of the peninsula is seen from aloft.

From one to 3 miles eastward of Ras Raweiya are three small detached

sandy cape, the north-eastern extreme of the Raweiya peninsula, is about 1 mile north-eastward of Ras Raweiya bluff, and 2 miles E. by N. from the cape. There are two dangerous sunken rocks.

DOKHANA BAY is the general name of the whole inlet enclosed by the Raweiya and the reefs extending southward from it, from the point out of which the bay recedes in a N.N.W. direction nearly straight to the southern part or mouth of this bay is encumbered by small shoals and reefs. The part more particularly called Dokhana bay is the western side of this extensive bay, and about 9 miles long. It is a safe anchorage and plenty of water when once inside the bay, but the inner part of the inner entrance, the reefs extending from the point of the Raweiya reef by a bar, over which not more than 10 fathoms water can be carried, and as Sand island is the outer reef of a group of reefs, with from 9 to 12 feet, Dokhana bay is not a safe anchorage for small vessels.

On the western side of this extensive bay, and about 9 miles long, is the anchorage of Mahomed Ghul. The anchorage is a safe anchorage and plenty of water when once inside the bay, but the inner part of the inner entrance, the reefs extending from the point of the Raweiya reef by a bar, over which not more than 10 fathoms water can be carried, and as Sand island is the outer reef of a group of reefs, with from 9 to 12 feet, Dokhana bay is not a safe anchorage for small vessels.

At 36 miles S. $\frac{1}{2}$ E. from Ras Raweiya, or 37° 8' E., is the dangerous anchorage of the natives. Neither fresh water nor small vessels. The anchorage is a safe anchorage and plenty of water when once inside the bay, but the inner part of the inner entrance, the reefs extending from the point of the Raweiya reef by a bar, over which not more than 10 fathoms water can be carried, and as Sand island is the outer reef of a group of reefs, with from 9 to 12 feet, Dokhana bay is not a safe anchorage for small vessels.

Anchorage.—Between cape Elba and the point of the Raweiya, the coast is fringed with reefs, except where breaks give access to the coast, most of which afford good anchorage, but the numerous detached reefs lying 3 or 4 miles, and the shore; under many of which reefs, anchorage is also to be found, being the only guide. Some of these reefs are several miles long, especially that fronting the coast between Khor Delaweb and Amara Farat, which occupies a space $6\frac{1}{2}$ miles long by $3\frac{1}{2}$ miles wide.

See chart, No. 8c.

but rocks, barren sands, and innumerable shoals, except on the southern point of the island, where there are a few mangrove trees. The remains of two rough but dry wells were found at the northern end, but no vestige of a tank or any other building.

The island is surrounded by a coral reef, which extends upwards of 3 miles from its northern end, with the small low sandy islet of St. Fillans, only 4 feet above water, at its north-western edge; and a remarkable rock about 8 feet above water, 5 or 6 cables eastward of the islet. The northern edge of this reef forms the southern side of the northern entrance to Dokhana bay. On the spit projecting from the southern point of Makawar, there is a wreck.

Anchorage.—A rocky spit extends a mile off from the southern end of Makawar, with a patch of sand at its south-eastern edge sometimes above water; there is anchorage in 12 fathoms on the south-eastern side of this spit, and also on its western side in any depth required.*

Falcon reef.—This reef lies S.S.E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from the southern end of Makawar. Other shoals of considerable extent, but chiefly of unknown depths, lie both northward and westward of it, leaving a clear passage about $1\frac{1}{2}$ miles wide between them and the rocky spit extending from Makawar; the shoal northward of the Falcon reef is reported to have as little as $1\frac{1}{2}$ fathoms on it.

Mayeita is a small, high, barren island, 3 miles eastward of Makawar, on the south-eastern part of a coral reef $4\frac{1}{2}$ miles long and nearly 2 miles wide; the reef has on it another small island, one mile N.N.W. of Mayeita, showing about 2 feet above high water. This reef extends nearly a mile southward of Mayeita; at 2 miles S.S.W. of this island is a patch of sunken rocks, and about $4\frac{1}{2}$ miles from it, on the same bearing, is the $1\frac{1}{2}$ -fathom patch referred to in the description of Falcon reef and its neighbouring shoals. The southern entrance to the Makawar channel and from the sea is between these two patches, which are $1\frac{1}{2}$ or 2 miles apart. The southern high part of Makawar bearing about W. by N. $\frac{1}{4}$ N. is between them. There is a channel between Mayeita and Makawar, but with many sunken patches in it.

Between Ras Raweiya and Mayeita island there is a narrow channel, including the north-eastward

reef.—

a coral

cable-

above

chart, No. 8c.

Three bays, North bay, North-west bay, and South-east bay branch off from the main channel of the Sherm; they are, however, all choked by sand-bars and coral reefs. There is a passage to the inner anchorage on either side of the Middle shoal, but that on its eastern side is the widest and safest. The land on both sides is very low, and the northern shore is the best to keep aboard as far as the Middle shoal, the reefs on that side being very steep-to. There is no difficulty in seeing the reefs if the port is entered before noon.

Khor Dhu-l lawa, S. $\frac{1}{2}$ E. 39 miles from cape Elba and 7 miles south-eastward of Sherm Abu Amara Farat, runs about 2 miles inland, but is only one cable wide, with not more than one-third that navigable breadth in one part; its entrance is a gap in the coast reef, having a depth of 18 fathoms, and diminishing within to 15 and 11 fathoms. A sailing-vessel with a fair wind may run in here and anchor, but there is little space for swinging until $1\frac{1}{3}$ miles within the entrance, and no room for working.

Shab Dhu-l lawa.—From 3 to 5 miles north-eastward of Khor Dhu-l lawa is the breaking reef of the same name, from the southern part of which Abu Hamama hill bears W.N.W. This reef covers a space of about 2 miles.

KHOR SHINAB, in lat. $21^{\circ} 21' N.$, is nearly 5 miles S.E. of Khor Dhu-l lawa and 24 miles N.W. by N. from Sandy cape, which latter is 2 miles northward of Ras Raweiya; it is entered through a gap in the coast reef and it extends about 4 miles inland.

Entrance.—The coast reef extends between 6 and 7 cables from the northern point of entrance, and $5\frac{1}{2}$ cables on the southern side; here the channel is upwards of 200 yards wide, with from 80 to 15 fathoms water, the depth decreasing through the channel as the head is approached. A sailing-vessel may run in with a fair wind, but there is no working room in it.

The entrance is open on a W.S.W. bearing, but $1\frac{1}{3}$ miles within, the channel turns sharply to N.W., and then westward towards the head, where the Khor terminates in three small but deep bights, one to the northward, another to the southward, and a third westward in the general direction of the channel; at the head of the latter is Quoin hill, which, on with two small paps on the highest part of the land within, W. $\frac{1}{2}$ S., is a good mark for making Khor Shinab from seaward, though not visible at any great distance. It may also be found by the breaking patches $2\frac{1}{2}$ miles north-eastward of it, which are on with Abu Hamama hill when bearing about N.W. $\frac{1}{2}$ W.

Abu Hamama is visible much farther than Quoin hill, which is sometimes difficult to distinguish on account of the higher land behind it.

See chart, No. 8c, with plans of Khors.

Neither wood, water, nor fresh provisions are to be obtained at this port. This inlet is the southernmost of the nine just described, which all lie between cape Elba and Ras Raweiya.

Directions.—In approaching Khor Shinab from the north eastward, great care must be taken to avoid the outer sunken rock, which bears N.E. by E. $\frac{1}{2}$ E. 6 miles from the entrance. This rock seldom breaks and is difficult to discern even with a good look-out aloft; another and much larger reef lies in the same direction, about $2\frac{1}{2}$ miles from the entrance; there is deep water between these reefs. In the entrance, the northern reef is the most easily seen, as some parts are above water. The best anchorage would appear to be well up the harbour, the outer part being very narrow. The forenoon is the best time for entering, the reefs being scarcely discernible in the afternoon.

Quoin hill has a piece of land curiously projecting from its southern and highest brow, and is, as before described, close to the shore, at the upper part of Khor Shinab, and northward of the Haycock peak.

The Paps are a notch in the centre part of the highest hill about 23 miles inland, westward of the entrance to Khor Shinab.

Dangers.—From Khor Shinab, the coast trends S.E. $\frac{1}{2}$ S., about $23\frac{1}{2}$ miles to Sandy cape, the north-eastern point of the peninsula of Raweiya. The whole extent is fringed by a coast reef, and in the first 12 miles are several off-lying reefs, but all within 3 miles of the shore. Of these, two are breaking reefs $2\frac{1}{2}$ miles and $5\frac{1}{4}$ miles respectively south-eastward of the entrance of Khor Shinab; next follows Shab Kummere, beyond which there are no off-lying dangers until Sandy cape is approached.

Shab Kummere extends parallel with the shore nearly 5 miles in a north-west and south-east direction. From its north-western end, the Haycock peak bears N.W. by W. $\frac{3}{4}$ W. $8\frac{1}{4}$ miles, and from its south-eastern end, Sandy cape bears S.S.E. $11\frac{1}{2}$ miles. The inner edge of the reef is only one mile from the shore, and the outer edge about $2\frac{1}{2}$ miles. On its eastern and south-eastern sides it is steep-to. There are a few small patches in the channel between it and the shore, but near the reef, which can be seen by a good look-out. See view C on chart, showing appearance of the land from a position immediately outside this shoal.

RAS RAWEIYA is the central bluff point at the termination of the Raweiya peninsula, which peninsula is only a mile wide at its commencement abreast of Shab Kummere, but, projecting about 13 miles in a S.E. by S. direction, is between 3 and 4 miles wide at its head, where the central bluff has, about 2 miles distant from it on either side, low sandy points terminating the promontory in those directions. The head is

See chart, No. 8c.

encumbered by shoals, but has a large stretch of open water in the deep bay on its western side. When approaching Ras Raweiya on a W.S.W. bearing, the bluff makes as an island, which might be mistaken for Makawar island, but the absence of out-lying islands should correct this error; on a closer approach, the low connecting coast of the peninsula will be seen from aloft.

From one to 3 miles eastward of Ras Raweiya are three small detached reefs.

Sandy cape, the north-eastern extreme of the Raweiya peninsula, is 2 miles north-eastward of Ras Raweiya bluff, and 2 miles E. by N. from this cape are two dangerous sunken rocks.

DOKHANA BAY is the general name of the whole inlet enclosed by Ras Raweiya and the reefs extending southward from it, from the southern end of which the bay recedes in a N.N.W. direction nearly 20 miles; the southern part or mouth of this bay is encumbered by small islands, reefs, and shoals. The part more particularly called Dokhana bay is a small bay on the western side of this extensive bay, and about 9 miles northward of Baidib or Mahommed Ghul.

It has good anchorage and plenty of water when once inside the bay, but, at the north-western part of the inner entrance, the reefs extending from Sand island (see plan, Anchorage of Raweiya on chart No. 1,109) seem to be connected with the Raweiya reef by a bar, over which not more than from 2 to 3 fathoms water can be carried, and as Sand island is connected with the shore by another reef, with from 9 to 12 feet, Dokhana bay is practically closed to all but small vessels.*

Water.—Better water may be obtained at the anchorage in the inner bay of Dokhana than that generally met with on this coast. The well is about a mile from the beach, to which water casks may be rolled and filled, or the water may be purchased of the natives. Neither fresh provisions nor firewood are to be procured.

MAKAWAR ISLAND is $6\frac{1}{2}$ miles long, N. by E. and S. by W., and about $1\frac{1}{2}$ miles wide; it is about 4 miles from the coast, and nearly parallel with it. Its southern point is in lat. $20^{\circ} 44' N.$, and, from its northern end, Ras Raweiya bears N. $\frac{3}{4}$ E. $10\frac{1}{2}$ miles. It is rather high table-land composed of rocky sandstone, in steep cliffs, apparently worn away by heavy rains. It has a very sterile appearance, there being nothing

* Information derived from H.M.S. *Cygnets* and *Starling* in 1885 and 1886. A passage of $2\frac{1}{4}$ fathoms through the reef westward of Sand island was sounded by the *Cygnets*, but it was during the season when the water level is at its highest in the Red sea. The *Starling* succeeded, by the aid of a boat ahead, in worming her way across the bar eastward of Sand island and proceeded to the very head of the bay, returning by the same route.

See chart, No 8c.

but rocks, barren sands, and innumerable shoals, except on the southern point of the island, where there are a few mangrove trees. The remains of two rough but dry wells were found at the northern end, but no vestige of a tank or any other building.

The island is surrounded by a coral reef, which extends upwards of 3 miles from its northern end, with the small low sandy islet of St. Fillans, only 4 feet above water, at its north-western edge; and a remarkable rock about 8 feet above water, 5 or 6 cables eastward of the islet. The northern edge of this reef forms the southern side of the northern entrance to Dokhana bay. On the spit projecting from the southern point of Makawar, there is a wreck.

Anchorage.—A rocky spit extends a mile off from the southern end of Makawar, with a patch of sand at its south-eastern edge sometimes above water; there is anchorage in 12 fathoms on the south-eastern side of this spit, and also on its western side in any depth required.*

Falcon reef.—This reef lies S.S.E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from the southern end of Makawar. Other shoals of considerable extent, but chiefly of unknown depths, lie both northward and westward of it, leaving a clear passage about $1\frac{1}{2}$ miles wide between them and the rocky spit extending from Makawar; the shoal northward of the Falcon reef is reported to have as little as $1\frac{1}{2}$ fathoms on it.

Mayeita is a small, high, barren island, 3 miles eastward of Makawar, on the south-eastern part of a coral reef $4\frac{1}{2}$ miles long and nearly 2 miles wide; the reef has on it another small island, one mile N.N.W. of Mayeita, showing about 2 feet above high water. This reef extends nearly a mile southward of Mayeita; at 2 miles S.S.W. of this island is a patch of sunken rocks, and about $4\frac{1}{2}$ miles from it, on the same bearing, is the $1\frac{1}{2}$ -fathom patch referred to in the description of Falcon reef and its neighbouring shoals. The southern entrance to the Makawar channel and Baidib from the sea is between these two patches, which are $1\frac{1}{2}$ or 2 miles apart. The southern high part of Makawar bearing about W. by N. $\frac{1}{4}$ N. leads through between them. There is a channel between Mayeita and Makawar islands, but with many sunken patches in it.

DANGERS.—Between Ras Raweiya and Mayeita island there is a continued mass of rocky patches and deep narrow channels, including the two small sandy islands and a reef showing above water north-eastward of that island, now to be described.

Umm el Kurush, Shab Baraya, and Abington reef.—The latter is the outer reef of those referred to in this part; it is a coral

* In January 1895, H.M.S. *Melita*, reported that a sunken wreck, about one cable west of the southern extreme of this rocky spit, shows its masts a few inches above water.

See chart, No. 8c.

patch, circular in shape, about half a cable in diameter, and shows above water. It is in lat. $20^{\circ} 53\frac{1}{2}'$ N., long. $37^{\circ} 26\frac{1}{2}'$ E., and, from it, Umm el Kurush bears S.S.W. $\frac{1}{2}$ W. about 2 miles. Umm el Kurush, the easternmost of the two sandy islands, is 7 miles N.E. by E. $\frac{1}{2}$ E. from Mayeita, and has two other reefs, within 2 miles of it, in line with that island. Shab Baraya, the other sandy islet, is 3 miles westward of Umm el Kurush, and is on the southern end of a large reef extending 4 miles to the northward, and on which the East India Company's sloop of war *Nautilus* was wrecked in the year 1833.

In-shore of Makawar island, and sheltered by it and the reefs northward of it, are the harbours of Baidib or Mahommed Ghul and Mukaffal.

MAHOMMED GHUL or BAIDIB.—This village is in lat. $20^{\circ} 53' 45''$ N. It has a fort, landing-jetty, and custom-house, but, with the exception of one large stone building, now consists entirely of Arab huts, the place having been destroyed in the rebellion of 1882; it has a considerable trade in salt, of which large quantities are exported every year, both by native craft and by steamers, the salt being brought alongside ships in the Raweiya anchorage from the salt pans of Raweiya, in native sambuks ranging from 25 to 100 tons. It has both an outer and inner anchorage; the former is known as the anchorage of Raweiya, the latter as the anchorage of Mahommed Ghul.

Raweiya anchorage is formed and protected by a series of shoals, reefs, and islets, leaving the shore between 2 and 3 miles northward of Baidib, extending eastward from the shore $3\frac{1}{2}$ miles, and then turning S.S.E. $\frac{1}{2}$ E. a farther distance of nearly 4 miles, having near its southern extreme a sandy islet about 8 feet high covered with shrubs, named Engineer islet. The northern entrance to the anchorage, fit only for small vessels, is between this islet and that of St. Fillans, already described; the two islets are less than 7 cables apart, and the navigable channel between them is about $2\frac{3}{4}$ cables wide. A least depth of $4\frac{1}{4}$ fathoms should be ensured by preserving a mid-channel course.

North-westward of Engineer islet, are two other islets on the reef; Bathing island, only about one foot above water and 2 cables in length; and Sand island, before referred to (*see* page 136), about 6 feet above water, and covered with low thick scrub; the former is on the outer arm of the reef, the latter on that projecting from the shore.

The anchorage is several miles in extent, well sheltered, and fit for vessels of any size; a good berth is in $6\frac{1}{2}$ fathoms, sand, and good holding ground, with Bathing island (distant $7\frac{1}{2}$ cables) on with the high land of Ras Raweiya N.N.E. $\frac{1}{2}$ E.; St. Fillans islet S.E., and the fort at Mahommed Ghul W. by S. $\frac{1}{4}$ S. Northward of this position the ground is foul.

The approach to the inner anchorage of Mahommed Ghul is opposite the passage between St. Fillans and Engineer islets; it is very narrow, winding, and intricate, with a dangerous 6-foot rock in the entrance. There are two stone beacons 6 feet high, one on either side of the channel, to assist in its navigation; but the chart, the eye, and the lead, are better guides than any description. With care, a small and handy steamer should be able to anchor within a cable of the jetty, without crossing anything less than 5 fathoms water. The dangerous 6-foot rock in the entrance should be left on the starboard hand in entering.

Khor Mukaffal is about 7 miles southward of Baidib and abreast of the southern part of Makawar island; it is formed by a narrow break in the coast reef and has good anchorage for bagalas, but neither wood nor water can be obtained. Nearly 2 miles southward of it is Little Mukaffal, with a shoal patch which sometimes breaks $1\frac{1}{2}$ miles eastward of it in the Makawar channel, here nearly 4 miles wide.

Directions.—Vessels bound to Baidib or to any of the anchorages inside the Raweiya reefs and Makawar island have the choice of several channels, but none of those northward of Makawar are fit for any but small vessels. These both enter and leave, at times, by the various passages through the outer reefs, but the inshore track from the northward and the entrance northward of Makawar island, as indicated on Admiralty chart, No. 8c, Red sea, sheet 3, is probably the best, though it is very intricate and only to be navigated by the eye. On rounding the southern edge of the Raweiya reef, the channel between St. Fillans and Engineer islets is open on a W. by S. $\frac{1}{4}$ S. bearing; pass through it in mid-channel, and, having cleared the south-western spit of Engineer islet, either haul up for the anchorage of Raweiya, as already described, or steer W. $\frac{1}{4}$ N. for the entrance to the inner anchorage off Mahommed Ghul.

A vessel wishing to enter Dokhana bay must haul up to the north-westward after rounding the Raweiya shoals, as the only entrance to that bay is from this direction, *see* page 136, but it is so barred by shoals that it should not be attempted by vessels drawing more than 12 feet, and even these may not succeed in finding sufficient water.

The southern and main entrance to these anchorages may be taken by vessels of any size. Having made Makawar, the southern shoulder of its high land should be brought to bear W. $\frac{1}{4}$ S., then steer W. by S. $\frac{1}{4}$ S., passing 3 or 4 miles southward of Umm el Kurush, and from thence W.S.W. until $2\frac{1}{2}$ miles southward of Mayeita, keeping a sharp look-out for the sunken reef 2 miles S.S.W. of that island. Having passed this reef, steer W. $\frac{1}{4}$ S. to pass, in not less than 9 fathoms, the southern spit of the Makawar reef, *see* note page 137; haul round this, and passing between Makawar and the patch off Little Mukaffal which sometimes breaks, but is

See plan, No. 1,103, and chart, No. 8c.

otherwise not easily seen, a N. by W. course for about 9 or 10 miles leads to the anchorage of Raweiya off Mahommed Ghul.*

Dabadiba anchorage and Tiflah channel.—Dabadiba anchorage is about 9 miles southward of Khor Mukaffal. The Tiflah islands are just southward of it, and between them and the main is the channel in; it is only half a mile wide, but by preserving a mid-channel course the depths are from 5 fathoms in the southern entrance to 7 or 8 fathoms through the channel; the anchorage bears from the northern part of the islands W. by N. $\frac{1}{2}$ N. 2 miles. This anchorage is small, but the bottom is mud, and good protection from northerly winds may be found by anchoring close up inside the point of the reef.

Dabadiba hill, in lat. $20^{\circ} 39' N.$, long. $37^{\circ} 6\frac{1}{2}' E.$, is a good mark in clearing the shoals on this part of the coast; when seen from the south-eastward it somewhat resembles Gibraltar as seen from the westward, but is smaller.

Tiflah islands are about half a mile from the coast, near Dabadiba, and consist of three sandy islets, of which the two eastern are covered with bushes, and the western one partially so; they are surrounded by shoal water and sunken patches of rock, the two outer reefs lying S.E. and S.E. by S. 7 miles respectively from the islands. From the first of these two reefs, which bears S.W. by S. 6 miles from Katat el Banná, a shoal spit appears to extend one mile in a S.S.E. $\frac{1}{2}$ E. direction from the part of the reef which breaks; at one mile N.W. by W. $\frac{1}{2}$ W. from the second of these reefs, there is a shoal with a least depth of 4 feet on it, and two other shoal patches near to the northward.

Anchorage.—Anchorage may be had under the westernmost islet with protection against northerly winds in from 10 to 4 fathoms, very irregular soundings; protection against southerly winds may also be found in irregular soundings of from 5 to 14 fathoms, $1\frac{1}{2}$ miles northward of the Tiflah islands.

KATAT EL BANNA, the outermost reef in this neighbourhood, is small, isolated, and surrounded by deep water; it lies $7\frac{1}{2}$ miles S. by E. $\frac{3}{4}$ E. from the southern end of Mayeita island; and, from it Dabadiba bears W. $\frac{1}{2}$ S. 11 miles, and the southern sandy point of Makawar island N.W. by W. 9 miles.

* Capt. Fitzgerald, of the ss. *St. Fillans*, in his valuable remarks on approaching this anchorage from seaward, states that the strength and variable nature of the currents, largely influenced by the wind, should induce great caution in making the land. He says:—"In September 1887, the *St. Fillans* was set S. by E. 14 miles in 12 hours; and, on her passage from Jidda in April 1888, she was set N.W. by W. 12 miles in 13 hours."

See chart, No. 8c.

MOUNTAINS.—**Jebel Tariba** is a high mountain about 19 miles inland from Baidib; it is in lat. $20^{\circ} 50' N.$, long. $36^{\circ} 50' E.$, and is a very useful mark from seaward. On the northern part of the summit are two small rugged elevations, the northernmost of which is seen from Awi Teri to Khor Duh-l lawa, a distance of 80 miles; at the latter, it shows as the highest part of land to the southward.

Mallago or Chimney hill, so called from its similarity to a chimney, is 25 miles south-westward of Dabadiba; it is at the southern extreme of the Tariba range, and is 22 miles southward of Jebel Tariba; the mountain peak called the False chimney, presently described, lies about 12 miles south-westward of it.

Small Peak, on the near hills, has a flat top, and is a little northward of Jebel Tariba. The Sugar-loaf is a peaked mountain in the range between Jebel Tariba and the coast, and is northward of Chimney hill before mentioned.

False Chimney hill is in lat. $20^{\circ} 19\frac{1}{2}' N.$, long. $36^{\circ} 37' E.$ It is just seen off Sheikh Barud as a high mountain with rugged top, assimilating in appearance to chimneys, whence its name; its range appears to run about East and West. Off Mersa Ar-rakiya and Awi Teri it appears as a sharp-peaked mountain like a sugar-loaf, and from a vessel off Salaka, when bearing W. $\frac{1}{2}$ S., its top is seen just above the northern brow of a dip in Table mount, a round elongated mountain about 1,100 feet high and 4 or 5 miles inland from Salaka; see views on chart.

SALAKA is about 35 miles southward of Ras Raweiyā and 79 miles northward of Sawákin. There are some rocky patches nearly in mid-channel between the coast reef and the outer reefs about 6 miles southward of it, as well as off Salaka, and the narrowest part of the inshore channel is only half a mile southward of this place. A sandy spit bordered by the coast reef, projecting in a S.W. by S. direction, forms a small bay on its western side; the entrance is between the sandy spit and some sunken rocks southward of it, whose discoloured water may be seen in clear weather. In this bay is an anchorage in 9 or 10 fathoms, mud, surrounded by patches of sunken rocks; it is, however, doubtful whether the sunken rocks in the entrance would afford sufficient protection in strong southerly winds.

A vessel entering the bay may either round the sand-spit reef closely, leaving the sunken rocks southward of it on the port hand, or may pass in between these sunken rocks and the shore reef southward of them, this latter being rather the widest channel. In either case the passage is very narrow and intricate, and the eye the only guide. The *Benares* found a least depth of 3 fathoms, rocky bottom, in either entrance.

The Channels leading to Salaka are narrow ; in approaching it from the north-eastward, keep close round the sandy spit reef, which is well marked, to avoid the detached mid-channel patches south-eastward of the spit. The channel to the southward is between the shore reef and the outer reefs, and, when 3 or 4 miles southward of Salaka, it opens out to a general width of $2\frac{1}{2}$ miles ; the rocky passages lying nearly in mid-channel about 6 miles southward of Salaka should be passed on their eastern side ; from 14 to 24 fathoms have been found in the narrow part of the channel near Salaka ; elsewhere the water is generally deep. Salaka inshore channel is narrowed by sunken shoals to 2 cables, and it is necessary, off the centre reef, to keep within a cable of the shore reef.

Outer Anchorage.—Vessels not wishing to enter this intricate bay may obtain indifferent anchorage, with bad holding ground, outside the sandy spit, on the southern side of its reefs, but the water deepens quickly off it ; the *Benares* anchored in $3\frac{1}{2}$ fathoms, rocks and sand, and when brought up was in 10 fathoms, rocks and sand. This anchorage could not be taken up in a southerly wind. No supplies of any description are to be had here.

Little Salaka is a mile southward of Salaka and is only a narrow break in the reef leading into a small bay, full of shoals ; a fit anchorage for nothing larger than boats.

Shab Suadi.—From abreast of Salaka, a series of reefs, having narrow openings and outlying patches, extends in a S. $\frac{1}{2}$ W. direction for 18 miles, their outer edge being about 7 miles from the shore, and their inner edge, when clear of the narrows at Salaka, from 3 to 4 miles. The southernmost of these reefs is Shab Suadi, and its southern end is in lat. $20^{\circ} 7' N.$ It is about 4 miles from the shore, and is 6 miles and upwards in extent, its northern extreme being eastward of Mersa Ar-Rakiya.

Three miles S.S.W. of the south end of Shab Suadi, and about $2\frac{1}{2}$ miles off shore, there is a reef about $1\frac{1}{2}$ miles long ; southward of which in lat. $20^{\circ} 2' N.$, long. $37^{\circ} 15' E.$, a reef of 9 feet, the existence of which is doubtful, has been reported.

MERSA AR-RAKIYA is $14\frac{1}{2}$ miles southward of Salaka and 65 miles from Sawākin. The coast towards Awi Teri has some rocky patches near its reef, and the entrance to this place is surrounded by them, with deep water close to. Abreast of the anchorage presently described is the entrance to a little land-locked bay 4 or 5 cables in extent, but with a small coral island in the entrance reducing its navigable width, northward of the island, to about 30 yards, with from 6 to 8 fathoms water ; the interior of the bay has also from 6 to 8 fathoms, but has so many little

See chart, No. 8c.

coral heads rising to within 4 feet of the surface as to make it quite unfit for anything but boats or small dhows.

Water.—About 300 yards from the north-western shore of this bay, are two wells of slightly brackish water.

Anchorage.—The only anchorage fit for vessels of any size is on the eastern side of the small coral island lying in the entrance to the inner bay; the space is narrow and encompassed by a reef, which, with northerly winds, makes it necessary to keep the weather side of the khor close on board; the holding ground is excellent. In mid-channel, the soundings are 12 fathoms, mud, and there is smooth water with all winds. There is only room for one vessel at single anchor, with a short scope of cable out, but two moderate sized vessels can with safety lie moored here.

The channel in from outside the outer reefs is through an opening northward of Shab Suadi, the largest shoal off its entrance; in this channel, which is about 5 cables wide, with the mouth of the khor open, two small patches are left on the starboard hand, mount Kumad Rabat, 6,400 feet high and 27 miles inland, being then on with the southern end of the small coral island before mentioned, bearing W. by S. $\frac{1}{4}$ S.

This channel is frequently used by native craft trading between this shore and Jidda; it cannot, however, be recommended as a safe channel for vessels, and with so many others available should not be resorted to. For the Arab traders, it has this advantage:—with moderate northerly winds, they can fetch Jidda from it, and thus avoid working up to and through the narrow and intricate parts near Salaka. With fresh northerly winds it is customary for these vessels to work up from anchorage to anchorage on this shore, daily, until abreast of Makawar, from whence they stretch across to Jidda.

Mersa Awi Teri.—At $3\frac{1}{2}$ miles from Mersa Ar-rakiya is Awi Teri; this mersa is a gap in the coast reef, 3 cables wide at the entrance and about the same length, with 26 fathoms, mud, in mid-channel, which decreases to 8 fathoms close to the reefs. Country boats anchor close in, and there is just room for a ship to lie in 20 fathoms, moored head and stern, with the bower anchor let go as close to the northern reef as possible, and very little cable out, but it affords very little protection. A small stream runs into the head of the cove, which makes this a favourite anchorage with native craft. Off the anchorage, Kumad Rabat bears W. $\frac{3}{4}$ S.

MERSA FEJER.—Twelve miles southward of Mersa Ar-rakiya is Mersa Fejer. This khor is a little inlet to which there is access by a

See plan of Ar-rakiya, on chart, No. 8c.

break in the coast reef, in a bight of which there is good anchorage in 13 fathoms, mud. Within this anchorage is a sandy spit forming a small bay, in which there are 6 or 7 fathoms water, but the channel into it is narrow. There is a mushroom-shaped shoal forming the southern side of entrance to the khor, which is not easily seen, has 4 and 5 fathoms water close to, and 13 feet, or possibly less, on it. This shoal extends along just outside the coast reef in patches as far as Mersa Arús, one mile to the southward, affording anchorage between them in from 5 to 6 fathoms, but fit for boats only. On this outside shoal is a one-fathom rock.

To enter Mersa Fejer, keep close along round the point of the reef forming the northern side of the entrance, from which mount Kumad Rabat bears W. by N. Wood may be cut here, and bullocks may be obtained.

Mount Kumad Rabat, in lat. $20^{\circ} 2\frac{1}{2}'$ N., long. $36^{\circ} 43'$ E. the most conspicuous land on this coast, is a conical mountain, 6,400 feet high and $2\frac{1}{2}$ miles from the nearest shore, which is at Mersa Fejer; it has a crooked peak on its summit and does not greatly alter its appearance by change of bearing; it may be seen from the island of Makawar to as far southward as Mersa Amid.

MERSA DURUR, in lat. $19^{\circ} 50'$ N., is 11 miles S. by E. $\frac{1}{4}$ E. from Mersa Fejer and 43 miles from Sawákin. It is a break in the coast reef three-quarters of a cable wide at the entrance with from 5 to 6 fathoms water, but shoaling to 20 and 14 feet as the narrow entrance opens out into a bay 9 cables in width, the centre occupied by a low swampy island covered with thick bush, the surrounding depths of water everywhere, except immediately fronting the entrance, being only 3 or 4 feet. In December 1892, three feet less water was found in this harbour than the depths here given. Another low island of the same character lies on the reef forming the southern side of the entrance. Eastward of this island, but just southward of the entrance, is a detached coral reef with only 2 feet water on which the sea breaks; and, a shoal about a cable in extent north and south, with a depth of $4\frac{1}{2}$ fathoms lies N.E. by E. $\frac{1}{4}$ E. 4 cables from the entrance, the bottom coral and sand. There is a channel on either side of the shoal southward of the entrance, but the northern channel is the most direct; the bottom in mid-channel is mud, and the depth decreases gradually.

Anchorage.—The best anchorage within the entrance is just within the outer island, in $3\frac{1}{2}$ or 3 fathoms, from whence Saddle hill, or Sharr Kerib, bears W. by N. $\frac{1}{4}$ N.; here a small vessel has just swinging room with a short scope of cable. This place is, however, of little or no value as a harbour, except to very small vessels, it being so very shallow. Anchorage in from 7 to 10 fathoms may be obtained off the entrance.

See chart, No. 81, with plan of Mersa Durur.

There is a detached reef about $1\frac{3}{4}$ miles southward of the entrance, and half a mile from the coast reef; it occasionally breaks with a fresh breeze. Its centre is in line with Kumad Rabat when bearing N.W. by W. $\frac{3}{8}$ W.

Supplies.—Wood may be procured at Mersa Durur, and water in small quantities, but it is about half a mile from the beach, and, if required, is usually brought down in goat-skins upon asses. Bullocks, sheep, and goats are also to be obtained.

REEFS.—A mass of reefs, many of which are separated from each other by very deep water, extends a considerable distance off the shore between the parallels of Mersa Fejer, and that of one mile south of Mersa Durur; the eastern horn of the edge being approximately in lat. $19^{\circ} 55' N.$, long. $37^{\circ} 27' E.$ Seamen are cautioned to pass outside this position. There are fewer breaks in the reef on the south-western side, which lies nearly parallel with the coast at the distance of from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles; the deep water channel between it and the shore reef, with depths of from 15 to 30 fathoms, is about one mile wide.

Between Mersa Durur and Mersa Sheikh Barud, the coast reef has projecting shoals and should not be approached by passing vessels within one mile.

Mersa Kihai is about 11 miles southward of Mersa Durur, and is formed by the coast reef and two or three low swampy islands; it is very narrow, with deep water close to its edges; the anchorage is contracted, and the depth 9 or 10 fathoms. To sail in, keep close along the weather side and anchor near the weather shore, in order to have room to veer cable. From the entrance, mount Az-zuhdat Rihleh, or Arud Trelor, bears W. $\frac{3}{4}$ S.

MERSA SHEIKH BARUD.—About 14 miles S. $\frac{3}{4}$ W. from Mersa Durur is the entrance to Mersa Sheikh Barud, useful as a temporary anchorage. This Mersa is named after a chief, the ruins of whose tomb on the northern point of the entrance is a good sea-mark. The khor is formed by a gap in the coast reef, by which it is also bordered; its north-western arm extends inland $2\frac{1}{2}$ miles, with depths of from 14 to 8 fathoms, mud, for $1\frac{1}{2}$ miles, and then irregular soundings. A small vessel can go up in mid-channel, but could not turn without using warps.

The western arm extends about half a mile, and shoals gradually; there is a donga at its head trending more than a mile in a south-westerly direction, in which, during the wet season, there is fresh water, but, in the summer, only a shallow tidal drain. The land round the khor is about 6 feet high. When abreast of the place, the notch in Az-zuhdat Rihleh bears West.

Directions.—The tomb on the northern entrance point is more in the shape of a small cottage than of the ordinary Arab tombs, and its summit being about 25 feet above the sea, can be seen from the masthead of a vessel from a considerable distance. This tomb on with the pass between Arud Trelor and the next peak southward of it W. $\frac{1}{4}$ S. leads 2 or 3 cables southward of the outer reefs, which are $3\frac{1}{2}$ miles distant from the tomb. On entering the khor, keep the reef on the port hand about a cable distant, and give the point on the starboard hand a berth, as the reef extends about half a cable; but the eye is the only guide, and, if obliged to enter with the sun ahead, moor a boat close off the bend of the reef eastward of the tomb and pass her at half a cable.

There is good anchorage in 14 fathoms near the entrance of the north-western arm with the tomb bearing about S.E. by E. Here there is room for three vessels of moderate size at single anchor.

Supplies.—No supplies of any kind can be procured, but there are some springs of good water on the southern side of the khor, about a mile from the beach. Fish may be obtained by the seine in the western arm. Game is plentiful but somewhat wild.

THE COAST from Mersa Sheikh Barud to Sawákin is quite low, being composed entirely of raised coral reef, furrowed by the beds of streams which are wet only in the rainy season. The plain between the coast and the hills is dotted with low scrub and bushes about 10 feet high.

Coast reef.—Anchorages.—There are several breaks in the coast reef between Mersa Sheikh Barud and Sawákin, giving shelter only for boats and dhows. These are Mersa Amid, $11\frac{1}{2}$ miles from Sheikh Barud, its position marked by Mangrove island, inside the coast reef, covered with bush, and 7 or 8 cables northward of it; Mersa Atá, 19 miles southward of Sheikh Barud, and marked by a wooded islet which may be seen many miles distant, and off which the soundings are irregular for about 2 cables; Shab Damath, $3\frac{1}{2}$ miles southward of Mersa Atá, is a projecting horn of reef, inside of which is Mersa Kuwai, larger than the others and having irregular soundings. There is room in Mersa Kuwai for three or four vessels of moderate size; but the southern end of the outer reef does not show well: it should, therefore, be buoyed before entering. At 2 miles northward of Sawákin there is also a small break in the reef.

The fringing coast reefs project somewhat seaward at Towartit elbow in lat. $19^{\circ} 29' N.$, and 21 miles northward of Sawákin; here it narrows the channel between the fringing reef and the off-lying reefs to $1\frac{1}{2}$ miles. From thence to Sawákin, the edge of the fringing coast reef is well marked, except at Hadarawip spit, known to the natives and pilots as Ras Abdallah, 7 miles southward of Towartit elbow, where a $2\frac{1}{4}$ -fathoms patch lies at the extreme of an extension from the shore reef nearly a

mile from the shore; and at Shab Damath, where the projecting horn, forming Mersa Kuwai, does not always break.

Buoy.—A red spherical buoy is moored eastward of the edge of the 2½-fathoms reef extending off the shore at Hadarawip (Ras Abdallah), in lat. $19^{\circ} 22\frac{1}{2}'$ N., long. $37^{\circ} 19'$ E.

MOUNTAINS.—**Az-zuhdat Rihleh or Arud Trelor**, westward of Sheikh Barud, is a conspicuous whale-backed range, 4,424 feet high, whose summit is in lat. $19^{\circ} 34\frac{1}{2}'$ N., long. $36^{\circ} 54'$ E.; it has an abrupt gap on the southern side of the summit and a small notch just northward of the summit. The Hadarawip range, to the southward, is low in comparison; and the mountains next to the northward, Sharr Kerib, 1,000 feet higher, show conical peaks and saddles.

By these marks Arud Trelor, an important landmark in the northern approach to Sawákin, may be known.

Hadarawip hill is one of a comparatively low group of irregular hills nearing the shore half way between Sawákin and Mersa Sheikh Barud. From the northward, the central sharp peak, which is 1,607 feet high, in lat. $19^{\circ} 21'$ N., long. $37^{\circ} 8\frac{1}{2}'$ E., and appears sharp on every bearing, becomes useful for ascertaining the ship's position. The next hill to the westward is Hadarawip hill, and from the southward this shows as a blunt cone.

Waratab, 2,056 feet high, is the highland just northward of the parallel of Sawákin. It is the highest and most prominent conical hill, the top being broken into two small knobs. At a distance, its aspect is that of a truncated cone or volcanic summit, and it has this appearance on every bearing except from S.W. to W.S.W., when it is almost sharp. This peak and Hadarawip sharp peak are most useful for bearings.

North-westward of Waratab is a rounded peak with a long serrated shoulder, and under the peak, when viewed from the north-eastward, a remarkable shining quartz patch is frequently visible. The village of Handub, through which passes the road to Berber, is 3 miles northward of Waratab.

Southward of Waratab the higher ranges trend inland, but two conspicuous saddle-shaped hills stand well to the front. Of these, the North saddle is frequently difficult to see on account of its colour. The South saddle loses its shape when bearing northward of W. by N. Quoin hill, small, wedge-shaped, and 828 feet high, is situated N.E. by E. of the North saddle; it is the nearest hill to the coast and a useful landmark.

INNER CHANNEL from KHOR DHU-L LAWA to SAWÁKIN.—The shore, coast and adjacent reefs, islands, and anchorages in the whole of this space are described in the preceding pages

of this chapter ; nevertheless, for ready reference, it may be convenient for the mariner intending to navigate by the Inner channel, to have before him comprehensive general description of its character, with which view the following particulars are now added.

The land throughout this tract is high and mountainous in the interior, of barren aspect, decreasing in several ranges towards the coast, and at from 6 to 10 miles from the coast terminating in a broken ridge of hills on a sandy plain extending to the sea, and partially covered with short furze and tufts of coarse grass, without any appearance of cultivation.

Outer reefs.—The outer reefs forming the Inner channel along this shore are generally from 2 to 3 miles from it, except in the neighbourhood of Ras Raweiya, Dabadiba, Sulaka, and Mersa Amid ; at Ras Raweiya, especially, they approach it within half a mile. The outer parts of these reefs are 12 to 14 miles off-shore, and are in patches, with deep water between them.

Detached rocks.—Between Dhu-l lawa and the two dangerous rocky patches E. $\frac{1}{2}$ N. 2 miles from Sandy cape, Ras Raweiya, there are several small clusters.

The first is Shab Dhu-l lawa, from $2\frac{1}{2}$ to 5 miles off-shore, north-eastward of Khor Dhu-l lawa ; see page 134.

The second and third are north-eastward of Khor Shinab, $2\frac{1}{2}$ and 6 miles respectively from the shore ; they are described at page 135.

The next is Shab Kummere, 8 miles from Khor Shinab, and described at page 135 ; it is a narrow shoal running parallel with the shore for about 5 miles, leaving an inner channel one mile wide, with several small sunken patches in it near the reef. Between the reefs off Shinab and Shab Kummere are also two small patches.

Southward of Ras Raweiya, and between it and Sawákin, there are five good navigable openings, fit for large ships, through the outer line of reefs by which the Inner channel may be reached. There exists, indeed, an intricate inner channel for small vessels close round Sandy cape, keeping the Raweiya shoals on board and passing between two little islets northward of Makawar island, thus entering either the anchorage off Mahommed Ghul or the Inner channel between Makawar and the shore reef as may be desired ; see page 139. Large vessels, however, should keep outside the reefs at this point, carefully avoiding the two rocks E. by N. 2 miles from Sandy cape, as well as the outlying dangerous Abington reef, and Umm el Kurush, just south-westward of it, and both described at page 137. When southward of the last named, a ship is in position to take the northernmost or First opening for the Inner channel.

First Opening is about 2 miles wide between the two rocky patches lying at 2 and 4 miles S.S.W. from Mayeita island ; see *directions*,

See chart, No. 8c.

page 139. From the northernmost of these, the reefs continue northward to lat. $21^{\circ} 3' N.$, including all those about Makawar and Ras Raweiya, as already described at page 138.

Second Opening.—This opening, between the parallels $20^{\circ} 32' N.$ and $20^{\circ} 26' N.$, is the second inlet to and the fourth outlet from Sawákin; it is about 6 miles wide.

From lat. $20^{\circ} 43' N.$ to lat. $20^{\circ} 32' N.$, where the reefs terminate 9 miles south-eastward of Dabadiba, the space is rocky. A little southward of Dabadiba this cluster, on the western part of which are the Tiflah islands, approaches within half a mile of the shore; the passage between, known as the Tiflah channel, though very narrow, carries from 5 to 7 and 8 fathoms if mid-channel is preserved. See page 140.

Dangerous outer rock.—Katat el Banná, the outer patch in this vicinity, bears S.E. by E. 9 miles from the sandy point of Makawar island. It is described at page 140.

Outer reefs.—From the parallel of Salaka to the narrow outlet north-eastward of Ar-rakiya, described at page 143, but not considered as one of the five principal openings, the outer reefs extend in patches; and for 3 miles southward of Salaka they become more numerous and approach nearer to the shore, the channel half a mile southward of this place being reduced to half a mile or less in width by some sunken rocks nearly in mid channel; when Table mount begins to shut in with the top of False Chimney hill, a good look-out should be kept for these rocks. At page 142 will be found directions for the narrow channel at Salaka.

The outer reefs continue for 18 miles from Salaka to the southward, there terminating in Shab Suadi, described at page 142. On the inside of this latter shoal are many patches of sunken rocks, with small channels to the open sea, none of which are frequented or considered safe, except that before alluded to north-eastward of Ar-rakiya and described at page 143; this passage is not recommended for ordinary traffic though frequently used by native vessels.

CAUTION.—Anchorage.—In cloudy weather it is sometimes difficult to discern sunken rocks and patches; it is then advisable to remain at anchor at Salaka, or at some other anchorage in the neighbourhood of the reefs, until the weather clears. If coming from the southward, anchorage may be found about 2 miles southward of the sandy spit at Salaka, in 7 or 8 fathoms, rock and sand, under the two small patches westward of the largest reefs bordering this narrow part of the channel.

Anchorage on rock and sand may also be obtained under the lee of many patches of the outer reefs between Salaka and Mersa Durur, especially north-eastward of Ar-rakiya, under the southern part of the reefs in 10 fathoms.

See chart, No. 8c.

Third Opening.—The northern limit of the third opening is the southern part of Shab Suadi in lat. $20^{\circ} 7' N.$, and E. by S. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles from Awi Teri; it extends to the parallel of Mersa Fejer, but there are two rocky patches $2\frac{1}{4}$ to 4 miles from the shore, nearly in the centre of it; see page 142. ' 1

Outer reefs.—Between Mersa Fejer and Mersa Durur, the outer reefs extend in patches nearly 15 miles off-shore, see page 145, their inner part being distant from the shore about 2 miles; the Inner channel at this part is, therefore, only about one mile wide.

Fourth opening.—The northern limit of this opening is about a mile south of the parallel of Mersa Durur; it is probably about $2\frac{1}{2}$ miles wide, but its southern limit cannot be defined as the edges of the reefs in that direction have not been surveyed, and it is obstructed by the rocky heads of the Mercier shoals, one of which, with only 10 feet water, bears S.S.E. $\frac{1}{2}$ E. about 7 miles from the entrance of Mersa Durur, and is 3 or 4 miles from the nearest shore; the other heads discovered during the survey, by H.M.S. *Myrmidon*, extend at least 4 miles north-eastward of this position. Eastward of these shoals and 11 miles from the shore, in lat. $19^{\circ} 46\frac{1}{2}' N.$, long. $37^{\circ} 26' E.$, is the northern extreme of the dangerous Sanganeb reef, described at page 155.

From the Mercier shoals, the inner edge of the outer reefs extends in a S.S.W. direction to the parallel $19^{\circ} 37' N.$ At their southern extreme is a patch which dries during the summer when the waters of the Red sea are at their lowest level. From this patch, the tomb at the entrance of Mersa Sheikh Barud bears W. by S. 3 miles. The Inner channel between these shoals and the shore reef is $1\frac{1}{2}$ or 2 miles wide, but between Mersa Fejer and Mersa Sheikh Barud the shore reef has projecting shoals, so that a distance of about a mile should be preserved from the shore.

Fifth opening, called also the Northern approach to Sawákin, lies between lat. $19^{\circ} 37'$ and $19^{\circ} 32' N.$, or between the drying patch described in the last paragraph, and the beacon marking the North extreme of the North Towartit reef. From this opening southward to Sawákin, reefs are scattered to a distance of 30 miles off-shore.

The two last named openings are considered by the natives to be the best in the neighbourhood. From abreast of the northern end of the North Towartit reef to the entrance of Sawákin, a distance of 23 miles, the direction of the Inner channel is S. $\frac{3}{4}$ E., and its general navigable width from one mile to $1\frac{1}{2}$ miles, though at places it is as much as 3 miles wide.

SAWÁKIN.—The khor or inlet of Sawákin, or Suakin, in lat. $19^{\circ} 7' N.$, is bordered by a reef of rocks on either side, and extends in a general south-west and north-east direction, its length being 2 miles, and

See chart, No. 81.

its breadth at the narrowest part, 180 yards. The bordering reefs are covered in December, but dry from May to August. The shores are about 5 feet high, and of gravelly appearance.

The channel is marked by five white stone beacons, three on the northern, two on the southern side; they are placed on the edges of the bordering reefs, the two outer beacons bearing from each other N. $\frac{3}{4}$ W. and S. $\frac{3}{4}$ E. 4 cables. But little dependence should be placed on the permanence of these beacons, or of any buoys which may from time to time be moored as they are sometimes washed away, and the means for replacing them are very scanty.

Depths.—In the entrance of the khor there is a depth of 25 fathoms, the soundings gradually decreasing towards Quarantine island, outside the fringing reef of which the depths are from 6 to 8 fathoms. The bottom throughout the channel is mud.

Quarantine island is 2 miles within the entrance, and, fronting the channel, divides it into two arms, the North-west and South-west arms. The island has several piers, mostly in a state of great decay; three of the more important piers were temporarily repaired in 1896 for landing an Indian Field Force; two of them admit of steamers of 20 feet draught lying alongside to discharge cargo, one hold at a time. Quarantine island is connected with the mainland on its western side by a causeway.

The North-west Arm is about 8 cables in length, half that distance being in a W.N.W. direction, the remainder turning to the northward. In the outer part are 7 and 8 fathoms water, and, in this part, four mooring buoys are placed off Quarantine island. Farther up, the arm is obstructed by the Myrmidon shoal of 8 feet water, and by other large shallow patches, as it turns to the northward. There is, however, a narrow 4-fathoms channel, up to within 2 cables of the head of this inlet.

The South-west Arm at $3\frac{1}{2}$ cables within its entrance, is again divided by Sawákin island on which the town stands. Up to the town the channel is half a cable wide with depths of from 6 to 8 fathoms. Northward of the town is a space of the same width with from 4 to 5 fathoms, and a narrow channel with a least depth of $2\frac{1}{2}$ fathoms passes along its eastern side, opening out into a considerable but shallow basin southward of the town with, however, from $4\frac{1}{2}$ to 4 fathoms in parts.

THE TOWN OF SAWÁKIN is built of coral and completely covers the small island of that name. The houses are well built after the Arab style, and lofty. The island is connected with its suburb, El-Kaff, on the mainland by a causeway. El-Kaff is much larger than Sawákin, but the dwellings are of a lighter structure, consisting mainly of grass

huts surrounded by compounds; it has a very fairly supplied bazaar. A census of the population in February, 1897, gave the people within the walls as 6,038, but at times there is the addition of a great migratory number which sometimes may reach 7,000.

Coal and Supplies.—Coal in moderate quantities can be obtained, about 600 tons being usually in stock; it is put on board by lighters, about 200 tons being the maximum quantity embarked in one day; the harbour being land-locked, coaling is never impeded by the weather. Beef, mutton, vegetables, and other sorts of provisions may be obtained; fish are plentiful, but difficult to catch by a stranger. Condensed water can be purchased at 4 shillings per ton, and the condensers can produce 150 tons a day. Good water in small quantities is brought in on donkeys from about a mile beyond the town. There are many wells outside the town from which the water is slightly brackish, but it is used by the natives for drinking. Ice can be obtained in the hot weather. There are no facilities for repairs of any sort for shipping.

Quarantine, &c.—The regulations as to quarantine are determined by the International Sanatory Commission at Alexandria.

Sawákin has two hospitals, one civil, and one military, both native; admission can be obtained to them subject to payment.

Trade and Communications.—Sawákin is of some importance to commerce, on account of its being naturally the easiest point of communication with the Sudan country. The outbreak of the rebellion, however, destroyed all trade, and in consequence of subsequent troubles in the interior trade for many years has been very fluctuating, but no doubt under the more settled state of affairs now prevailing, prosperity will gradually return. In the year 1898 the value of the exports amounted to £65,650, and that of the imports to £177,558, only about half what they were previous to 1882. The imports are grain, food stuffs, and cotton goods; the exports, gum, cotton, and ivory. Small native vessels carry on a coasting trade.

There is communication fortnightly by Egyptian steamers; the itinerary being Suez, Jidda, Sawákin, Massawa, Hodeida, Aden. Every second month, Austro-Hungarian Lloyd's steamers call, bound from or to Trieste, Bombay, and Hong Kong. All steamers carry mails. There is a fortnightly camel post from Sawákin to Berber and Kassala; the time averaging eight and nine days respectively.

Telegraph cables.—Sawákin is connected by Eastern telegraph cable with Aden, Suez, Perim, and Obokh, and by Ottoman cable with Jidda. Communication by land lines is established through Berber to Alexandria, and Khartum; also to Tokar and Kassala, and thence to Massawa, and to Suk-abu-sin.

Caution.—The telegraph cables lie on the side of the reef bordering the southern shore of the harbour, starting from the cable house on the southern side, half way between Graham point and Quarantine island. Unless absolutely necessary, therefore, kedge anchors should not be laid on that part of the reef.

Winds.—The general winds are either land and sea breezes, or they blow in a line with the coast, inclining off the land at night, and from seaward early in the forenoon. In spring and summer, the sea breeze generally sets in about 9 a.m. and subsides suddenly at 5 p.m.; but outside the harbour, it continues later. Sand-storms are experienced during summer; when fresh land squalls blow, sand fills the air for 40 or 50 miles seaward, rendering objects invisible at more than half a mile.

Temperature.—The heat at Sawákin is very great during June, July, August, and September, the thermometer rising in sand-storms to 105° on board ship, and to several degrees higher in the town. Europeans have consequently to guard against sun-stroke and enteric fever, avoiding exposure to the sun as much as possible.

The average temperature in April 1884 was 80°; average maximum 87°.

“ “ “ “ May “ 83°; “ “ 89°.

“ “ “ “ June “ 88°; “ “ 95°.

“ “ “ “ July “ 89°; “ “ 95½°.

The difference between the wet and dry bulb thermometers was often 21°.

In January, the average daily temperature appears to be from 76° to 78°; the night temperature from 71° to 74°. See Appendix, page 479.

Tides.—In Sawákin harbour there are single day tides, or one high and one low water a day. The rise and fall, at springs, being only about 18 inches, and much influenced by winds and other causes. The total rise and fall from a low summer tide to a high winter tide is 3 feet, as the mean winter level is 18 inches higher than the mean summer level. During the fortnight from full moon to change, or from change to full moon, the level of the water rises a foot for the first seven days, and falls a foot for the next seven, the lowest water occurring at about full and change, the diurnal rise and fall continuing all through.

It is high water at full and change at 1 h. approximately.

Anchorage.—The harbour will accommodate about 20 vessels without blocking the channel; though as many as 34 vessels, men-of-war and transports, were berthed in the harlour at one time during the expedition of 1884. Merchant vessels anchor in the main channel, immediately north-eastward of the town, and secure their sterns to bollards on the jetties. Vessels of war anchor in the North-west arm north-eastward and northward of Quarantine island, with a stern hawser to that

island or else to an anchor or post on the northern shore; the holding ground is not good in this arm, and its western part, as before stated, is obstructed by the Myrmidon shoal, having only 8 feet water.

There is room for one vessel in the inlet S.S.E. of the town, where there are depths of from $2\frac{1}{2}$ to 4 fathoms, but the channel in is very narrow, and only suitable for small vessels.

Directions.—No pilots for Sawákin are to be obtained; but, in the channel, the eye is the best guide, as the reef bordering the khor is easily seen. The channel is open when Waratab hill bears W. $\frac{1}{4}$ N. The Caravanserai, a square stone building, a tall minaret westward of it, and the dome-shaped mosque Abdullah, are conspicuous objects to those approaching. The massive stone chimney and high iron funnel of the condensing apparatus on Quarantine island can be seen 12 miles distant.

From a position eastward of the North entrance beacon, the dome of the mosque Abdullah is on with Graham point S.E. $\frac{1}{4}$ S., the southern entrance point of the harbour; these objects in line lead nearly up to the second beacon on the starboard hand, but by the time the first beacon on the port hand is abeam, the channel can be clearly seen. Give the first beacon on the port hand a berth of $1\frac{1}{2}$ cables in rounding the northern end of the reef on which it stands. The turning at the second beacon on the port hand is sharp, but the beacon may be passed at half a cable. On the northern entrance point is a yellow mound with a tomb behind it.

The Sawákin group of out-lying reefs, shoals, and islets, fronts the coast from Sawákin to Nowarat, extending from the North Jumna reef, in lat. $19^{\circ} 27' N.$, long. $37^{\circ} 43' E.$, to Dahret Abid island, in lat. $18^{\circ} 21' N.$, long. $38^{\circ} 46' E.$, a distance of nearly 90 miles in a S.E. $\frac{1}{2}$ S. direction; some of the reefs lying as much as 15 miles outside or north-eastward of this line, and nearly 40 miles from the nearest part of the mainland. They extend over an area about 25 miles wide; their inner boundary, where there are many sunken rocks and very deep channels, being generally about 10 miles from the shore. The various islets and shoals of this group, in so far as they affect navigation and are of interest to the mariner, are described in their natural order in the following pages.

APPROACHES TO SAWÁKIN.—Sawákin is approached by either of three principal routes according to the direction from whence a vessel is coming:—viz., the Northern, North-eastern, and Southern approaches. The first leads in from the open sea to the northern Inner channel by the Fifth opening, already described; the second enters just northward of Hind Kádam islet, of the Sawákin group; and the third leads up by the southern Inner channel, passing inside or westward of Tella-tella Seghir island, also of the Sawákin group.

See plan, No. 901, and chart, No. 81.

NORTHERN APPROACH.—This approach to Sawákin leads into the Inner channel passing southward of the Sanganeb reef and of the shoals off Mersa Sheik Barud and northward of the Towartit reefs, on rounding the northern extreme of which latter reefs, the Inner channel is entered.

SANGANEB REEF is of horse-shoe shape, open to the West, 3 miles long North and South, and one mile wide. The southern end is in lat. $19^{\circ} 43\frac{1}{2}'$ N., long. $37^{\circ} 26'$ E. The reef is steep-to and generally breaks, and within the area enclosed affords anchorage in 25 fathoms, white clay mud. To approach the anchorage, the entrance to which is about 2 cables wide, and is one mile northward of the south-western extreme of the reef, pass about three-quarters of a cable northward of the horn on the starboard hand, which shows clearly; and, after crossing a narrow ridge of from 5 to 8 fathoms, steer to the north-eastward and anchor in the middle of the reef.

Beacon.—A stone beacon has been erected 100 yards from the southern end of the reef. The beacon is 10 feet high, and is surmounted by a staff and ball, the summit of which is 35 feet above the sea, and can be seen in clear weather at the distance of 10 miles; *see* view on chart.

TOWARTIT REEFS.—This extensive cluster extends from a position $6\frac{1}{2}$ miles south-eastward of Mersa Sheikh Barud to a position $2\frac{1}{2}$ miles E.N.E. of Sawákin, and forms between it and the fringing shore reef a channel from one to 3 miles wide. All these reefs, with the exception of those at the southern end, show in a moderate breeze. The most dangerous is a narrow reef S.W. by S. one mile from the northern extreme, and about 3 cables westward of the western edge of the group.

A stranded steamer, with the fore part low in the water and the after part high and dry, is (1899) on one of the patches of the Towartit reefs, west of Williamson shoal. It lies approximately in lat. $19^{\circ} 17\frac{1}{4}'$ N., long. $37^{\circ} 22\frac{3}{4}'$ E.

Beacon.—A white beacon of masonry, 16 feet high, has been erected on the northern extreme of the North Towartit reef; it is surmounted by a staff with triangle, the entire beacon being 30 feet in height. Its position is lat. $19^{\circ} 31' 40''$ N., long. $37^{\circ} 19'$ E.

From the northern horn, the outer shoal edge trends S.E. $\frac{3}{4}$ E. $8\frac{3}{4}$ miles, and then S. by E. $\frac{3}{4}$ E. $7\frac{1}{4}$ miles; here there are two dangerous clusters, Heyman reef, and 3 miles southward of it, Williamson shoals, both of which seldom break. To clear the southern end of the Towartit reefs, do not bring Quoin hill to the right of the northern entrance beacon. These two objects in line bearing W. by S. $\frac{1}{8}$ S. lead $2\frac{1}{2}$ cables southward of the reefs.

Directions.—Owing to the uncertainty of the current, it may sometimes be difficult to sight the Sanganeb beacon when entering by the northern approach.* A good guide to it is Az-zuhdat Ribleh or Arud Trelor mountain, which bears W. by S. $\frac{1}{2}$ S., 31 miles from it and is nearly always visible in the forenoon; *see* view on chart. Sanganeb reef may be passed on either hand, and, from its beacon, the Towartit beacon bears S.W. by S. $13\frac{1}{4}$ miles. If wishing to approach Mersa Sheikh Barud, the course is S.W. $\frac{1}{2}$ W. until the tomb is sighted, when attention should be paid to the directions at page 146. On the coast, nearly 9 miles southward of Mersa Sheikh Barud and near Towartit elbow, there is said to be a conspicuous single tree.

The northern horn of the Towartit reefs breaks freely in moderate weather. Having sighted the beacon, or the breakers should the beacon have been washed away, continue on a south-westerly course towards the shore-fringing reef, taking care not to approach it within a distance of 5 cables. When half way between the northern horn and the shore reef, the course may be altered to S. $\frac{3}{4}$ E., which course leads to a position off the northern beacon at the entrance of Sawákin harbour.

In thick weather, it is safest to keep on the shore side of the channel, but the indentations of the reef must not be followed.

NORTH-EASTERN APPROACH.—Except in the early morning, this approach to Sawákin is somewhat dangerous, owing to the hills and land-marks being generally obscured by mist, especially in summer; the reefs also are not easy to distinguish during this season, owing to the prevailing calms. The eye is thus the essential guide to safety, and the vessel should have the sun in a favourable position. This channel is sometimes preferred by those leaving Sawákin late in the afternoon, when, if the South Jumna shoal can be cleared before dark, a course can be shaped to the open sea.

The following are the islands and reefs bordering this channel :—

Hind Kadám, the northern island of the Sawákin group, is in lat. $19^{\circ} 23' N.$, long. $37^{\circ} 54' E.$; it is a small coral island topped with bush, 15 feet above the sea, and visible when 7 or 8 miles distant. The island is encircled by a reef extending one cable northward of it, steep-to, and affording no anchorage. Hind Kadám is visited by turtle catchers.

Beacon.—A beacon has been erected on Hind Kadám, consisting of a black iron frame surmounted with a cage-work ball standing on a white

* In the neighbourhood of the Sanganeb reef, northerly or westerly currents of considerable strength appear to be commonly experienced all the year round, but principally in the summer months. This is, however, not invariably the case, currents in the opposite directions being sometimes experienced, and they appear to be of most frequent occurrence in the winter months.

See chart, No. 81.

pyramidal masonry base. The beacon is 40 feet in height, the summit being 55 feet above high water, and is visible a distance of about 12 miles.

Reefs.—Peshwa reef, of small extent, upon which the sea generally breaks, is said to lie E. by S. $\frac{1}{4}$ S., $5\frac{1}{4}$ miles from Hind Kadám; about midway, in a line between the above, there is a small rocky patch. Another rocky patch, 3 cables in extent, lies W. by S. $\frac{1}{4}$ S., 4 miles from Hind Kadám; this patch is steep-to, and breaks in a moderate swell.

Keary reef is a small patch lying S.W. $\frac{3}{4}$ W., 6 miles from Hind Kadám, which sometimes breaks; another reef lies S.S.E. $\frac{3}{4}$ E., $4\frac{1}{2}$ miles from the island.

Seil Ad-dar, in the charts published in 1841, was shown as a small sand and coral island, steep-to, situated about 4 miles S. by W. $\frac{1}{2}$ W. from Hind Kadám; with, about 2 miles E. by N. $\frac{1}{2}$ N. from it, a rocky patch. Nothing was seen of this island by H.M.S. *Myrmidon* when examining this neighbourhood in 1884; it is considered possible that the sand may have been washed away, leaving only a submerged shoal.

North Jumna shoal, 11 miles W.N.W. from Hind Kadám, is a small coral reef awash, and, in a calm, a few heads of dead coral can be seen above water. The shoal is 2 cables in extent and steep-to.

Shab Anber is a long narrow reef, the northern end of which generally breaks. This extreme lies 12 miles W. by S. $\frac{1}{2}$ S. from Hind Kadám, and 22 miles N.E. by E. $\frac{2}{3}$ E. from Sawákin entrance. From the northern end, about half a mile wide, the reef at first trends S. by W., and then south-eastward, its whole length being about $5\frac{1}{2}$ miles. Nearly in the middle, on its western edge, is a coral head 5 feet out of water, and another head 3 feet above water lies $1\frac{1}{4}$ miles northward of it.

Shab Mobiyet is a narrow shoal partly submerged with alternate deep and shoal water throughout its length, about $2\frac{1}{2}$ miles. The northern end, nearly awash, bears S.S.W. $\frac{1}{2}$ W., $2\frac{3}{4}$ miles from the rock 5 feet high, on Shab Anber. A depth of 170 fathoms was obtained at 2 cables from the middle of the reef. A reef of a circular shape, half a mile in diameter, which shows light green, is situated about a mile south-eastward of Shab Mobiyet.

Shab Gusser is about 5 cables in extent, with a few coral heads showing on which the sea always breaks. It lies S.W. $\frac{1}{2}$ S. $9\frac{1}{2}$ miles from the northern end of Shab Anber. At $1\frac{1}{3}$ miles E. $\frac{1}{2}$ S. from Shab Gusser is Myrmidon pinnacle, a steep-sided 3-fathoms patch, 40 feet in extent.

Shab Tufl, $1\frac{1}{2}$ miles southward of Shab Gusser, is more than one mile in length in an E.S.E. and W.N.W. direction, and about half a mile in width; a shoal spit extends 2 miles from its southern side. The reef

See chart, No. 81.

generally breaks, but there is little indication of the spit, which is a source of danger to coasters approaching it from the eastward.

The passage between Gusser and Tuil appears to be clear.

Caution.—South-westward of Shab Tuil, and extending to the Kad Etwid reefs, is a dangerous area only partially examined, and in which are many reefs. No ship should attempt to pass over it.

Burns reef, Entrance reef, &c.—This long group of coral heads, commencing 5 miles S.W. by W. of Shab Gusser, extends in a W. by S. direction to within 2 miles of the coast reef. Entrance reef, a patch that generally breaks, bears S.W. by W. $\frac{7}{8}$ W. $9\frac{3}{4}$ miles from Shab Gusser, and E.S.E. $5\frac{1}{4}$ miles from Sawákin entrance. The channel between Burns reef and the South Jumna shoal is $3\frac{1}{4}$ miles wide.

Cunningham shoal, of less than one fathom, is at the north-western corner of this string of reefs, and lies westward one mile from Entrance reef, with which it is connected by a narrow tongue, sometimes visible as a blue line in the water. This reef also forms the north-western extreme of the Etwid group of reefs.

South Jumna shoal.—This dangerous shoal, lying in the fairway of the North-eastern approach, was discovered in 1884 by H.M.S. *Jumna*; the sea only breaks on it with a heavy swell. It has shoal heads of from $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms extending over a distance of 9 cables, and a 5-fathoms patch about 4 cables eastward of the southern part of these shoal heads. At its south-eastern end is a bank with from 8 to 12 fathoms, from which irregular broken ground extends eastward $2\frac{1}{4}$ miles with depths of from 17 to 60 fathoms. The shoal lies E. by N. $\frac{1}{2}$ N. $9\frac{1}{4}$ miles from Sawákin harbour entrance, and S.W. by W. $\frac{1}{2}$ W. $12\frac{3}{4}$ miles from the northern end of Shab Anber.

Buoy.—A buoy, with quadrangle and iron staff in the centre, painted red, the staff surmounted by a wooden ball, painted white, standing about 15 feet above the sea, is moored on the south-western side of the centre of the shoal patches of the South Jumna shoal; it lies about 7 cables south-eastward of the westernmost patch.

NOTE.—The buoys and beacons marking the approaches to Sawákin are liable to be washed away.

Discoloured water has been reported at 6 miles N.E. from the South Jumna shoal.

Directions.—In steering for Sawákin by the North-eastern approach the route indicated on Admiralty chart, No. 81, is that which should be followed. Thus, having sighted Hind Kadám a course should be shaped to pass $1\frac{3}{4}$ miles North of that island; thence, a W. by S. $\frac{3}{8}$ S. course for 12 miles leads $2\frac{1}{4}$ miles North of Shab Anber. Then steer S.W. $\frac{3}{4}$ S. $13\frac{1}{2}$ miles to pass between Shab Gusser and South Jumna shoal; when

See chart, No. 81.

2 miles past the Shab Gusser, or 2 miles westward of Shab Tuil, a straight course may be shaped for the entrance of the harbour, which will then bear W. $\frac{1}{4}$ S. $11\frac{1}{2}$ miles. Keep a good look out for the Towartit reefs, and, to clear them, keep Quoin hill in line with, or open southward of Sawákin North entrance beacon; *see* also page 156.

SOUTHERN APPROACH.—The aspect of the coast southward of Sawákin is similar to that northward of the harbour, *see* page 148, except that the hills are not so near the shore. There are several long islets covered with mangrove bushes and scrub along the shore, which, except when seen from aloft, cannot be distinguished as islands, the shore presenting an apparently unbroken coast line. The shore reef can generally be seen; it is broken in several places where there are boat harbours.

The mountain range approaches the coast at 27 miles southward of Sawákin, and then trends S.S.W. inland, leaving a large plain on which Jebel Shabab stands alone. The dust and mirage on this part of the coast frequently obscure it altogether.

From outside Shab-ul-Shubuk, nothing is ever seen of the coast between Mersa Sheikh Sad and Ras Makdah.

The following are the islands and reefs passed when entering by the Southern approach.

Tella-tella Seghir is an island consisting of raised coral, clifty on the south-west, but sandy and sloping on its north-eastern side. It is about $1\frac{1}{2}$ miles long E.S.E. and W.N.W., and has a narrow fringing reef on its southern shore and eastern end; shoal water apparently extends 5 to 8 cables from its west and northern coasts. The ridge of the island, about 40 feet above the sea, is quite bare, and there are several cairns on it. Anchorage may be had in from 17 to 20 fathoms, mud, off the south-eastern extreme of the island; or in $9\frac{1}{2}$ fathoms, good holding ground, under the southern side, less than 2 cables from the fringing reef.*

Méteore patch.—A patch of 7 fathoms, in lat. $18^{\circ} 39' N.$, long. $38^{\circ} 2' E.$, was sounded on by the French vessel *Méteore* in 1888.

Kad Hogít, 16 miles W. by N. from Tella-tella Seghir, is a reef in three parts, $1\frac{1}{2}$ miles in extent E.S.E. and W.N.W., and partly submerged. The eastern portion is generally visible; the western portion seldom, except when a swell is running, when it breaks. Near the centre of the shoal there is a small coral head, on which a sand-bank 2 feet high sometimes forms.

* In 1886, H.M.S. *Dolphin* searched for the 5-fathoms patch shown on the chart 2 miles southward of Tella-tella Seghir, but could find nothing less than 16 and 17 fathoms in the neighbourhood.

See chart, No. 81.

Beacon.—A white stone beacon, conical in shape, 25 feet above sea level, and surmounted by a staff and ball, is erected on the sand-bank. When proceeding eastward of the reef, do not pass within 8 cables of the beacon.

Southward of the reef there is anchorage in 10 fathoms, mud, with protection from all except south-easterly winds, the beacon bearing N.N.E. 4 cables.

Melita patch is a sand and coral shoal, circular in shape about 2 cables in diameter, having a least depth of $4\frac{1}{4}$ fathoms upon it, and 6 to 8 fathoms northward and southward, which lies with the beacon on the south-east point of Ul Shubuk bearing S.S.W. $\frac{1}{4}$ W., distant $1\frac{2}{3}$ miles, and Round islet W. by S. $\frac{1}{2}$ S.

Cygnat patch, lying about half a mile eastward of Melita patch, is a narrow sand and coral shoal about $2\frac{1}{2}$ cables long east and west, with a least depth of $4\frac{1}{4}$ fathoms at its western end. Several heads of 5 fathoms lie within a distance of 2 miles between the bearings of N. by W. and N.N.E. from it, and shallow water is reported to exist at about a mile from the Cygnat patch, in an E.N.E. direction. Caution is therefore requisite when navigating in this locality.

Shab-ul-Shubuk is a large shoal entirely filling up the bight north-westward of Ras Makdah for a distance of 17 miles, and extending as much as 10 miles off-shore; between its western edge and the shore is a channel of deep water; this channel, however, has many shoal heads, and there is no advantage in using it as the passage outside the reef is of no greater length.* The eastern edge of Ul-Shubuk is generally visible, but the northern edge is much broken and submerged, thus necessitating the giving of it a wide berth.

A reef 6 cables long north and south, and $3\frac{1}{2}$ cables wide, having a small sand cay, one foot high, near its centre, is the south-eastern extreme of the Shab-ul-Shubuk, and is separated from the main reef by a passage one cable wide; it may be passed on the eastern side about 3 cables distant. The south-east point of this reef is marked by a stone beacon; $8\frac{1}{2}$ cables N.W. by W. $\frac{1}{4}$ W. of the sand cay is Round island, 9 feet high, near the outer edge of the Shubuk reef.

The eastern edge of Ul-Shubuk trends $13\frac{1}{2}$ miles N.W. $\frac{1}{4}$ N. to Corner reef, and then westerly $7\frac{1}{2}$ miles to within 2 miles of the shore. A break in the reef about 5 miles from the south-eastern extreme leads to Sumar inlet, which connects with the inner passages and affords anchorage in

* In 1885 H.M.S. *Condor* navigated this channel from the northward, entering it just southward of Mersa Sheikh Sad, and keeping the shore reef on board, the eye being the chief guide between the reefs. The channel is very intricate, and Lieut. F. C. Dundas, of that vessel, remarks: "This channel should not be attempted except when absolutely necessary."

6 to 9 fathoms. Gap islet, 8 feet high, near the edge of the reef, marks the position of the entrance, off which there is a bank with from $4\frac{1}{2}$ to 5 fathoms. The entrance to Sumar inlet is marked by a small beacon on either side.

Corner reef. — Beacon. — At the north-eastern corner of Ul-Shubuk, where the main reef bends to the westward, there are two small detached reefs, Corner reef, the outer one, being crescent-shaped, $1\frac{1}{2}$ miles from the main reef, and marked near its centre by a white masonry pillar beacon, surmounted by a staff and cage, standing about 20 feet above the sea. Shoal water of from $3\frac{1}{2}$ to 5 fathoms exists $1\frac{3}{4}$ miles north-westward from Corner reef, to which a wide berth should be given. Corner reef breaks in all weathers, except in a calm, and is even then generally visible.

Two-islet reef is a double reef with an islet on each part, the two reefs being separated by a narrow streak of deep water. The larger islet, 11 feet high, lies $5\frac{1}{4}$ miles N.E. by N. from Kad Hogit, and has short bushes in which numerous species of sea birds build their nests. This islet forms a useful mark for bearings in clearing the shoals northward of Ul-Shubuk; the smaller islet is 5 feet high. The reefs on which they lie extend 8 cables S.E. by S. from the islets and nearly as far northward of them.

Green reef is so named from its bright green colour when the sun is high; the southern extreme is $2\frac{1}{2}$ miles N.W. $\frac{1}{2}$ W. from the larger islet of Two-islet reef. The reef is $3\frac{1}{2}$ miles long north and south, and $1\frac{1}{2}$ miles wide; the northern and western sides are awash, but the eastern and south-eastern sides are submerged. From 18 to 20 fathoms are found off its western side, but northward of the reef the soundings are irregular.

A coral shoal, with a depth of $2\frac{1}{2}$ fathoms on it, and 5 to 7 fathoms around, is situated 2 miles N.N.E. of Green reef.

Kad Etwid reefs.—At $7\frac{3}{4}$ miles N.W. by W. $\frac{1}{4}$ W. from Corner reef of Ul-Shubuk, a small reef will generally be seen breaking. This is the South-east reef of the Kad Etwid group, and a spit of irregular soundings projects S.S.E. one mile from it. From this, the southern boundary of the cluster trends W.N.W. to a sand islet 6 feet high with bush upon it, lying $1\frac{1}{2}$ miles off the shore reef; the islet is surrounded by a reef nearly 2 cables wide, with deep water $1\frac{1}{2}$ cables westward of it. This is the South-west islet of the group, and is distant 11 miles S. by E. $\frac{1}{2}$ E. from the entrance of Sawákin; a shoal 3 cables in extent having only 4 fathoms water lies $1\frac{1}{2}$ miles S. by E. $\frac{1}{2}$ E. from the South-west islet.

From South-west islet, the inner edge of the reef trends N.E. $\frac{1}{2}$ N. 3 miles, and then N.N.W. $\frac{1}{4}$ W. $5\frac{1}{4}$ miles to about one mile from Cunningham shoal. Several shoals lie westward of the breaking reefs, but none within

a mile of the shore reef, except one 4-fathoms patch N. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles from South-west islet. There are three other islets on this reef, one, a sandy islet 8 feet high, similar to South-west islet $1\frac{1}{4}$ miles N.E. by E. from it; the two others have no bush.

There is no navigable passage through this group of reefs.

Channel between Shab-ul-Shubuk and Kad Etwid reefs.—The channel between the Kad Etwid reefs and Shab-ul-Shubuk is nearly $3\frac{1}{2}$ miles wide, but it is encumbered by shoals with from 4 to 7 fathoms. Besides the shoals already mentioned S. by E. $\frac{1}{2}$ E. of South-west islet, there exist two heads of $2\frac{1}{2}$ and $3\frac{1}{2}$ fathoms, coral, bearing respectively S.E. by E. $\frac{1}{4}$ E. 6 miles and S.E. by E. $\frac{5}{8}$ E. 9 miles from the same islet. The former is the Middle shoal and is marked by a buoy; the latter is that already described at page 161 as lying north-westward $1\frac{1}{4}$ miles from Corner reef of Ul-Shubuk.

Middle shoal buoy.—A can buoy painted red and white in horizontal stripes, and surmounted with staff and triangle, is moored on the Middle shoal, the westernmost of the two shoals just mentioned; if in position, it may be passed one cable distant on either hand, but the fairway lies northward of it. The buoy is, however, very liable to be washed away, *see* page 158.

Directions.—When approaching the entrance to the southern channel for Sawákin, inside the Sawákin group, great care is necessary as the currents are strong and very irregular; the approach should be so timed as to make sure of having broad daylight before any of the islands or shoals are neared, unless trustworthy astronomical observations have been obtained through the night; *see* caution, page 172. From Tella-tella Seghir island or from the South-eastward, pass about 3 cables north-eastward of the reef at the south-east end of Ul-Shubuk (which has a beacon on its south-east corner); then, following the track recommended on Admiralty chart No. 81, steer N.W. by W. $3\frac{3}{4}$ miles until Kad Hogít beacon bears N.N.E. $\frac{1}{4}$ E. The course will then be N.N.W. $\frac{1}{2}$ W. for $9\frac{3}{4}$ miles, and when Corner reef beacon bears S. by W., the course should be altered to W. $\frac{1}{2}$ N. to pass the Middle shoal buoy and to make the South-east reef of the Kad Etwid group.

Skirting the latter reef, which almost always breaks, at the distance of one mile, to avoid the spit extending southward of it, a westerly course carries a vessel to the shore-fringing reef which may then be followed all the way to Sawákin, keeping it at a distance of about 4 cables.

The dark hill standing in the foreground W. $\frac{1}{2}$ S. of this channel will with Waratab, be found useful for bearings.

Etwid islet is sandy, 9 feet high, has bush at its north-eastern end, and is encircled by a reef; it is visible from the southern approach and is

See chart, No. 81.

useful for determining the ship's position. A breaking reef lies $1\frac{1}{2}$ miles E.S.E. from it, and two more, which also break, lie $4\frac{1}{4}$ miles E. by N. from the islet; shoal water extends northward of the latter.

Etwid islet bears N.E. $\frac{1}{4}$ E. $5\frac{3}{4}$ miles from South-east reef of the Kad Etwid reefs, and vessels should not pass between them.

ANCHORAGES southward of Sawákin.—Mersa Haddhu, 12 miles southward from Sawákin, affords anchorage and landing for large boats and dhows. The entrance is about 2 miles S.W. by W. from South-west islet of the Kad Etwid group; it is only 150 feet wide and the depth is 2 fathoms just inside; the least water in the entrance is 7 feet. The inner harbour, called Mersa Likák Hindi, is 2 miles long with depths of from 3 to 6 feet; it has an opening at its northern end fit only for boats. There are said to be wells of indifferent water here.

Mersa Entabil and the northern entrance to Mersa Likák Hindi, both lying between Sawákin and Mersa Haddhu, are but breaks in the reef fit only for small boats.

Mersa Sheikh Ibrahim.—The entrance to this anchorage is 16 miles S. by E. from Sawákin; entering on a W. $\frac{1}{2}$ N. course, it gradually curves during the $8\frac{1}{2}$ cables of its length to W.S.W. and then opens out, southward, to an anchoring space $4\frac{1}{2}$ cables in length by $1\frac{1}{2}$ cables wide, good holding ground. The entrance channel is from one cable to half a cable in width; and the depths, from 17 fathoms at the mouth to 9 or 10 fathoms when half way in, and $5\frac{1}{4}$ fathoms at its inner end between Cairn point on the North and the reef on its southern side. The anchorage within has from $4\frac{1}{2}$ to 6 fathoms.

The highest part of mount Gumbereid on with a notch in the distant hills bearing W. $\frac{1}{2}$ N., leads up to the entrance; enter on this bearing and keep in mid-channel, anchoring about one cable beyond Cairn point.

On the north-western shore of this harbour, there are some high mangrove bushes, near which abundant traces of antelope, gazelle, &c., have been seen.

Mersa Sheikh Sad, 19 miles from Sawákin, is a well-protected reef harbour about 2 miles long, with from 3 to $4\frac{1}{2}$ fathoms in the first mile, decreasing to 6 or 7 feet towards the head. There is room for a short vessel to lie at single anchor just inside the entrance, but farther in a stern anchor is required. The entrance is in a westerly direction, curving to N.N.W. about 4 cables within the entrance, the principal length of the harbour lying parallel with the shore; its entrance is partly obstructed by shoals which can be seen under favourable circumstances.

The outer shoal in the entrance, with 6 feet water, is a mushroom shaped coral head and cannot be easily seen, but may be avoided by keeping close

to the reef on the northern side of entrance, which reef is dry in patches. There is no good landing-place in this Mersa as the water shoals gradually and boats ground about 50 yards from the shore. The country in the neighbourhood appears to be uninhabited and is thickly covered with brushwood.

Vessels approaching this Mersa from the northward should keep the shore reef on board, avoiding projecting horns. The ground eastward is unsounded and many patches of discoloured water have been seen in that direction.

The Inner channel passing in-shore of Shab-ul-Shubuk commences just southward of Mersa Sheikh Sad; it is, however, very intricate and unsurveyed, and should not be used unless necessity requires it, *see* note, p. 160.

Sand-hills point is nearly 13 miles S.E. by E. from Mersa Sheikh Sad, and has large sand-hills on it about 60 feet in height; in the bight between are two islands. Reefs extend from the point 2 miles in a N.E. and 4 miles in a N.W. direction.

Melita point, half a mile southward of which the land covered with scrub rises to a height of about 30 feet, is situated $2\frac{1}{2}$ miles E. by N. $\frac{3}{4}$ N. from Sand-hills point, and forms the west extreme of Mersa Makdah; hence there is a road to El Teb and Tokar.

RAS MAKDAH, 32 miles S.E. by S. from Sawákin, is a low point marked by a sandy ridge 37 feet high and a quarter of a mile long, the most conspicuous of the low sand-hills in the vicinity; three small islands only 5 to 8 feet above water lie northward of the point, and shoal ground extends $1\frac{1}{2}$ miles off-shore.

Mersa Makdah is the bight enclosed between the south-eastern part of Shab-ul-Shubuk and Ras Makdah. Anchorage in 6 to 8 fathoms, sand and mud, may be found over the northern portion of the bight under the lee of the reef, but the southern part is blocked by the shoals extending $1\frac{1}{2}$ miles northward from Ras Makdah.

Eagle anchorage.—At the south-western part of Mersa Makdah, there is good anchorage in 5 fathoms, sand, 6 cables south-eastward of the beacon on the east end of Eagle island reef. No supplies can be got at this anchorage, but fish are plentiful and may be caught with the seine on the sandy shore just south of Eagle island.

Beacons are placed as follows in Mersa Makdah:—Shubuk beacon, on the south point of the reef at south-east end of Shab-ul-Shubuk (*see* page 160); Sumar beacon, close to the west end of Sumar island; Point beacon, on the north-eastern edge of a detached reef, and one mile N.E. $\frac{3}{4}$ E. from Melita point; and Eagle beacon on the outer end of the reef extending eastward from Eagle island.

Rambler Shoal extends $4\frac{1}{2}$ cables in a N.N.W. and S.S.E. direction and is 2 cables wide, with a least depth upon it of 3 fathoms, coral, and $4\frac{1}{2}$ fathoms around; from it, the sand cay on the detached reef at the south-eastern extreme of Shab-ul-Shubuk bears N. by E. $\frac{1}{2}$ E. $1\frac{1}{3}$ miles.

Fairway patch.—A circular coral patch of 4 fathoms, 2 cables in diameter, lies with the sand cay on the south-eastern extreme of Shab-ul-Shubuk bearing N. $\frac{3}{4}$ W. $2\frac{1}{4}$ miles.

TRINKITAT HARBOUR (lat. $18^{\circ} 40'$ N., long. $37^{\circ} 44'$ E.).—About 2 miles south-eastward of Ras Makdah is Ras Makdam, the northern entrance point of the inlet forming the harbour of Trinkitat, about 10 miles inland from which is the fortified town of Tokar, occupied by the Egyptians, and commanding a richly productive district. The entrance to Trinkitat is not easily distinguished as the coast is low and sandy. Off the entrance is the extensive reef Katat Kennasha, which is steep-to, nearly awash, and, being always visible, forms the best mark for recognizing the position of Trinkitat. Between this reef and the entrance is a shoal, 2 cables long, having 19 feet least water near its southern end.

At present a white convict hulk, moored at the head of the harbour, is the best mark when making the place from the southward; a stone blockhouse for the convict guard on the shore at the south-west part of the anchorage is also a useful mark.

There is good anchorage outside the harbour in about 6 fathoms, under shelter of Katat Kennasha.

The harbour opens to the north-east, is about half a mile wide, extends three-quarters of a mile to the southward, has a depth of 4 fathoms, and is capable of accommodating twenty vessels drawing from 18 to 21 feet; the holding ground is good. The shores of the harbour are sandy with low bushes; a sandy plain, flooded at times, extends some distance inland. In the south-eastern corner of the harbour is the opening into a large shallow lagoon.

Entrance.—The entrance is between Ras Makdam and South point, bearing from each other N. by W. and S. by E. 5 cables. A spit, on which there are from 5 to 12 feet, extends $3\frac{1}{2}$ cables northward from South point with 18 feet at its northern extreme; this sometimes breaks in the centre at its shoalest part. A coral shoal also extends $1\frac{1}{2}$ cables from the northern shore with from 13 to 17 feet water at its extreme. The entrance between the shoals is, therefore, little more than half a cable wide. Two leading beacons are erected on the western shore of the harbour 120 yards apart; they consist of poles 35 feet high, the north-eastern one, close to the shore, being surmounted by a diamond-shaped cage; the south-western pole by a square cage. The beacons in line S.W. $\frac{2}{3}$ W. lead in between the shoals in 24 feet, least water. Should the

beacons be missing, a stranger should buoy the channel before attempting to enter.

Communication.—A railway to Tokar is in course of construction. Trinkitat is in telephonic connection with Tokar; thence by telegraph with Kassala, Khartum, Massawa, Sawákin, &c.

Katat Teronbo.—About 4 miles S.E. from Ras Makdam, the northern entrance point of Trinkitat harbour, is the rocky shoal Katat Teronbo; it is steep to on its seaward side but shoals gradually towards the shore, between which and it is a $3\frac{1}{2}$ -fathoms channel, where anchorage may be found in case of need.

The coast.—This part of the coast is low, barren, and sandy, full of salt-water swamps, and in some parts covered with bushes, but no fresh water is known to be procurable.

Ras Asis.—From the entrance to Trinkitat, the coast trends south-easterly about 12 miles to a slightly projecting point, and from thence S.E. $\frac{3}{4}$ E. 14 miles to Ras Asis, a low sandy point, marked by a cairn of loose stones, in lat. $18^{\circ} 26\frac{1}{2}'$ N., long. $38^{\circ} 7\frac{1}{2}'$ E., from which point, a rocky shoal extends some little distance, and north-eastward of which is a 4-fathoms patch $1\frac{1}{2}$ miles from the shore, with uneven soundings of from 5 to 15 fathoms for some distance outside it. Between Trinkitat and the first-named projecting point there are a few sand-hills, but the shore from this point to Ras Asis is very low and sandy, and the country for several miles inland continues to be of the same description.

RAS SHAKAL.—Beacons.—Ras Shakal is 13 miles S.E. $\frac{1}{4}$ E. from Ras Asis, the coast between forming a bay receding 7 miles with depths of from 17 to 6 fathoms. The cape is marked by a substantial white stone beacon, surmounted by an iron cross, the top of which is 25 feet above the sea; it stands on the most projecting islet, northward of the cape, which uncovers at low water. At $1\frac{3}{4}$ miles southward of this beacon is a small beacon on a mound near the sea-shore, merely a small cairn of stones very difficult to be seen from seaward; it is $1\frac{1}{4}$ miles N.W. by W. $\frac{1}{4}$ W. from Ras Istahi at the entrance to Khor Nowarat.

Between Ras Shakal and the Karb islands, distant 10 miles N.E. by E., the channel is clear with from 29 to 50 fathoms, but at that distance E. $\frac{1}{2}$ N. is a large patch with from 6 to 10 fathoms. There are soundings of from 6 to 7 fathoms at about $1\frac{1}{2}$ miles from the beacon. A safe depth in which to pass Ras Shakal is 30 fathoms (not less), or 4 miles distant.

Barrat Dodam, $7\frac{1}{2}$ miles S. $\frac{3}{4}$ W. from Ras Asis, is a narrow tongue of land with a reef on which are some islets.

Akik Seghir.—Anchorage.—At $5\frac{1}{2}$ miles S.E. $\frac{1}{2}$ E. from Barrat Dodam, is this small island at the head of the bay, from whence

to Ras Shakal the bearing and distance is N.E. by E. $\frac{1}{2}$ E. $6\frac{1}{2}$ miles. Two other small islets lie eastward of Akik Seghir, and a 2-fathoms patch a short distance north-eastward of the point. This island, with a small tongue of land westward of it, affords protection to an anchorage in 5 or 4 fathoms. Half a mile from the beach are some wells dug in the sand, containing brackish water in the dry season. About one mile from the beach, in the direction of Quoin hill, are some remarkable ruins in a straight narrow line, $1\frac{1}{2}$ miles in length, and from 20 to 60 feet wide; they are on raised ground, sloping from the centre to either side, and there are many graves.

Akik.—The town of Akik is just southward of these islands. Supplies, including sheep and bullocks, may be obtained. There is a caravan route from Akik to the interior.

Amarat islands.—From 2 to 3 miles westward of Ras Shakal, in the entrance of the bay, are the two Amarat islands, low and sandy, with a few bushes on them, standing on a coral reef; a depth of 4 fathoms extends about a mile north from the east end of the eastern island. Another small islet lies on the same reef southward of the eastern island; a little beyond it is a rocky patch. Between these and the land, on the south-eastern side of the bay, is a passage to Akik Seghir.

Diamond shoal.—A coral shoal, a mile long in a N. by W. and S. by E. direction, on the southern edge of which H.M.S. *Diamond* touched in the year 1878, lies about 2 miles northward of the eastern Amarat island. The least water found was 14 feet, with 12 fathoms close-to.

* At one to $1\frac{1}{2}$ miles N. by W. $\frac{3}{4}$ W. from Diamond shoal, a crescent-shaped shoal was observed by H.M.S. *Melita* (1896), with apparently a depth of $2\frac{1}{2}$ fathoms upon it.

KHOR NOWARAT is, without exception, the finest bay in the Red sea. Its breadth from Ras Istahi, the north-western point, marked by a small white conical stone beacon about 6 feet high at the water's edge, to Ras Farajin, is 4 miles, and it is the same distance from Farajin island to the head; but, the island of Bahdur occupies a large space in the centre of the bay.

Farajin island, 20 feet high, is connected with Ras Farajin by a reef, on which are two or three small islets, and through which native boats find a channel; there are also some small islets between Farajin and Bahdur island. The length of Farajin island, including Shatira island, joined to its north-western end by a reef, is nearly $3\frac{1}{2}$ miles, and the entrance to the bay is between Ras Istahi and Shatira island.

The coast surrounding the bay is low and sandy, but high land approaches within 5 miles of the shore.

See plan of Khor Nowarat, on chart, No. 8d.

Fronting the entrance is a chain of low sand and coral islands, which effectually keep out all swell or sea; they stand on coral reefs, and a few bushes or small trees grow on some of them. The northernmost of these is Guban, a coral island 25 feet high and half a mile off-shore, $1\frac{1}{2}$ miles S.E. of Ras Shakal; on the low eastern part of this island are two heaps of coral stones, now overgrown with grass, and therefore not easily seen. South-eastward of Guban are the Hajar islands, 20 feet high, three in number, and all on one reef, covering a length of 2 miles N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E. There are also two small islands in a swampy bay, inside and westward of Ras Istahi.

Entrance.—Depths.—The only entrance for ships is between Guban and the Hajar islands, where the depths are reported to be from 3 to 11 fathoms. Off Ras Istahi, a shoal of 3 fathoms extends $2\frac{1}{2}$ cables, and off the western end of Shatira island is a shoal easily discernable; the channel here is about 4 cables wide, with from $4\frac{1}{2}$ to 7 fathoms water. In the outer part of the bay the depths are from 4 to 6 fathoms, mud; in the inner part, where vessels anchor south-westward of Bahdur, there are $4\frac{1}{2}$ fathoms towards the island, gradually decreasing to 3 and 2 fathoms near the mainland.

There is an entrance channel between Farajin and the Hajar islands, through which the *Benares* sailed; but it is very narrow and cannot be recommended for ships, there being only 2 fathoms in some parts. Small vessels proceeding from khor Nowarat to the southward find this a convenient channel during northerly winds, or coming into the khor from the southward with southerly winds, as it shortens the distance in and out, as well as saving the time occupied in working through the North channel.

Bahdur island is $2\frac{1}{2}$ miles long, and three quarters of a mile wide; it consists of coral rock with a low sandy plain on the western part; on the eastern part it is rather woody. The town of Akik Kebir on the south-western part of Bahdur is a small place, garrisoned by about 100 Egyptian irregulars; it has a considerable trade with the coast in dhurra, cloth, calico, &c. It has a square stone mosque, and a little westward of the town, on the margin of the island opposite the ships' anchorage, in a small tomb.

Water.—About a quarter of a mile from the town are some tanks cut out of the solid rock, and a large cement tank has been constructed on the beach at the town to store water from the Egyptian condensing ship in summer if the natural supply should fail. In winter the water is very good.

No other supplies can be obtained here, but possibly bullocks and sheep might be had by opening up communications with Akik, 6 or 7 miles

See plan of Khor Nowarat, on chart, No. 8d.

distant across the isthmus separating Khor Nowarat from the deep bay north-westward of it, already described.

Tides.—It is high water, full and change, at Bahdur, at 1 h. 15 m.; the rise is $1\frac{1}{2}$ feet.

Aspect of the country.—The following is a description of the hills, as seen from Bahdur island :—

Saddle peak or Sugar-loaf is the southernmost detached hill of the near range southward of Bahdur, and resembles a sugar-loaf. Hummock peak is a remarkable rugged-topped hill, south-westward of the former. Bluff peak is north-west of the last and in the same range, being about 10 miles from the beach, and is the highest northern part of the mountains south-westward of Bahdur. Chimney hill is a high and remarkable mountain on the most distant range in the same direction as the last. Quoin hill is a small peak in the northern part of the near high range westward of Bahdur.

Landmark.—Mound hill is a low double-topped hill by itself, westward of the near high range of land surrounding the bay; approaching the entrance to Khor Nowarat, for which it is a good mark, it looks like an island.

Directions.—The entrance of khor Nowarat is difficult to distinguish at a distance, as there are no landmarks except Mound hill, just described, and the other hills some miles in the interior. Mound hill on a S.W. by S. bearing leads towards Ras Shakal until Guban island is made out.

The entrance between Guban island and the Hajar chain is half a mile wide, with from 3 to 11 fathoms. Give a berth, in rounding it, to the spit extending $2\frac{1}{2}$ cables off Ras Istahi, and then steer to the South-west to clear the shoal off Shatira island; in passing round the western point of Bahdur, give the spit off it a berth and anchor in 4 fathoms S.W. of the town. Deeper water and more room may be had northward of Bahdur.

The SAWÁKIN GROUP of islands, shoals, and reefs, as stated at page 154, front the coast from Sawákin to Nowarat, some of the outer reefs lying more than 30 miles from the nearest shore of the mainland. Hind Kadám, in lat. $19^{\circ} 23' N.$, long. $37^{\circ} 54' E.$, with all the reefs and shoals bordering on the North-eastern approach to Sawákin, are described at pages 156–158; the island of Tella-tella Seghir, with the reefs bordering on the Southern approach to Sawákin, at pages 159–162. It now, therefore, only remains to describe the islets and dangers not included in the two passages referred to, and mainly on the eastern or seaward side of this extensive group.

Barr Musa Kebir, an island in lat. $19^{\circ} 13' N.$, long. $38^{\circ} 10\frac{1}{2}' E.$, somewhat circular in shape, with a diameter of about three-quarters of a

mile, is composed of sand and coral, and has a few bushes upon it; it lies on the outside of the group at this part. Its northern point bears S.E. $\frac{3}{4}$ E. 18 miles from Hind Kadám. There is a reef about a mile north-westward of the island, and no bottom at 100 fathoms close to its southern side.

Barakut island, West about 9 miles from Barr Musa Kebir, is a low sand and coral island without anchorage, there being no bottom at 135 fathoms close to its southern side. Reefs extend from the eastern and western ends of this island.

Reefs.—There are four large breaking reefs, extending nearly 5 miles northward of Barakut island; the second is called Shab Barakut, and the northernmost Shab Kutb. The latter bears W.N.W. 10 miles from Barr Musa Kebir, and S.E. by S. 8 miles from Hind Kadám.

Seil Ad-dar Kebir island, bearing S.W. by S. $11\frac{1}{4}$ miles from Hind Kadám, and W. $\frac{7}{8}$ N., 11 miles from Barakut, is a small sand and coral island, 26 miles E. $\frac{5}{8}$ N. from the entrance to Sawákin; a reef extends half a mile northward from its north point, but there is no bottom at 120 fathoms a short distance south-eastward of it.

Canara reef.—On this reef, discovered by the steamship *Canara* in 1881, there are many shoal heads of one and 2 fathoms; it bears S.W. by W. $\frac{1}{4}$ W. $5\frac{1}{2}$ miles from Seil Ad-dar Kebir, and S.E. $\frac{3}{4}$ S., $4\frac{1}{4}$ miles from the northern end of Shab Mobiyet, described at page 157.

Three small reefs, each about a cable in extent, lying in a line east and west, are situated:—the western one 6 cables S. by E. from Canara reef, with the eastern reef bearing E. $\frac{1}{8}$ N., distant $4\frac{1}{2}$ cables from it.

Shab Muncar is a small crescent-shaped breaking reef, open on its southern side; in the summer of 1884, it had a sand bank near its western horn. It bears S. $\frac{1}{2}$ E. 6 miles from Seil Ad-dar Kebir. In 1886 a shoal patch about 8 cables long east and west, was reported to lie three-quarters of a mile south-eastward of Shab Muncar.

Pender reef, about a mile long east and west, on which the least water is $3\frac{1}{4}$ fathoms, lies N.N.W. $\frac{1}{4}$ W. $1\frac{6}{10}$ miles from the centre of Muncar.

Franks reef.—This reef, discovered by the *Canara* in 1881, is assumed to be about one mile long; the sea was observed to break on it. Its centre bears N. by E. $\frac{1}{4}$ E. about $3\frac{1}{2}$ miles from Shab Muncar, and S.S.E. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles from Seil Ad-dar Kebir. This shoal was not seen by H.M.S. *Myrmidon* during her survey of this locality in 1884.

Chiltern patches.—Chiltern patch, a small shoal with a depth of 2 fathoms, lies with Shab Muncar bearing N.N.W. $\frac{1}{4}$ W. $4\frac{1}{4}$ miles. A similar patch of the same depth and name (discovered in 1890) is situated

See chart, No. 81.

6 miles W. by N. $\frac{3}{4}$ N. from Barr Musa Seghir. Five miles eastward of the former of these patches there is a bank about 3 miles in extent, with soundings of 11 and 12 fathoms.

Barr Musa Seghir, in lat. $19^{\circ} 3' N.$, long. $38^{\circ} 11\frac{1}{2}' E.$, and 10 miles S. $\frac{1}{2}$ E. from Barr Musa Kebir, is an island about half a mile long, composed of coral and sand; it is steep-to, and close to its southern side are 238 fathoms.

Taimashiya island, 9 miles S.E. by S. from Barr Musa Seghir, is a low sand and coral island, where, in case of necessity, anchorage may be obtained. It is surrounded by a reef, and there are from 6 to 12 fathoms near its southern side, but the island is too small to afford any protection from swell.

Andi Seli island, in lat. $18^{\circ} 54' N.$, long. $38^{\circ} 36' E.$, and $17\frac{1}{2}$ miles E. by S. from Taimashiya, is a low circular coral island half a mile in diameter; N.W. $\frac{3}{4}$ W. about 2 miles from this island, is a patch of rocks.

Lokhah island.—About S.E. $\frac{1}{2}$ S. 5 miles from Andi Seli is Lokhah, also a low circular island about half a mile in diameter, with 67 fathoms at a short distance from its southern side.

Shab Lokhah is a breaking reef, above a mile in extent, $8\frac{1}{2}$ miles S.W. by W. from Lokhah island.

Masamarhu islands.—E. by S. $5\frac{1}{2}$ miles from Lokhah is the island of Masamarhu, in lat. $18^{\circ} 50' N.$; and S.S.E. $\frac{1}{2}$ E. 2 miles from it, is Karam Masamarhu. These islands are at the north-eastern corner of the Sawakin group; both are low and consist of sand and coral, with bushes on them, and both are steep-to and surrounded by very deep water; they afford no anchorage whatever.

CAUTION.—In the navigation of this part of the Red sea, the mariner is again specially cautioned to be on his guard against the effect of cross currents; see p. 20. The strength and direction of these currents varies extremely, and the knowledge of their existence should induce great vigilance and attention.

Tella-tella Kebir.—E. $\frac{1}{2}$ N. 8 miles from Tella tella Seghir, described at page 159, is the southern end of the reef on which are the Tella-tella Kebir islands. These are three low sand and coral islands, having at a distance the appearance of being only one; they are covered with bushes, and the extent of the reef on which they stand is 3 miles North and South by about 2 miles wide.

Soundings.—From Tella-tella Seghir to these islands, the soundings are regular, increasing from 7 to 28 fathoms, and then gradually decreasing to 20 fathoms, after which they are irregular towards the islands; the bottom, rocks and sand. There appears to be a barrier shoal of from

mile, is composed of sand and coral, and has a few bushes upon it; it lies on the outside of the group at this part. Its northern point bears S.E. $\frac{3}{4}$ E. 18 miles from Hind Kadám. There is a reef about a mile north-westward of the island, and no bottom at 100 fathoms close to its southern side.

Barakut island, West about 9 miles from Barr Musa Kebir, is a low sand and coral island without anchorage, there being no bottom at 135 fathoms close to its southern side. Reefs extend from the eastern and western ends of this island.

Reefs.—There are four large breaking reefs, extending nearly 5 miles northward of Barakut island; the second is called Shab Barakut, and the northernmost Shab Kutb. The latter bears W.N.W. 10 miles from Barr Musa Kebir, and S.E. by S. 8 miles from Hind Kadám.

Seil Ad-dar Kebir island, bearing S.W. by S. $11\frac{1}{4}$ miles from Hind Kadám, and W. $\frac{7}{8}$ N., 11 miles from Barakut, is a small sand and coral island, 26 miles E. $\frac{5}{8}$ N. from the entrance to Sawákin; a reef extends half a mile northward from its north point, but there is no bottom at 120 fathoms a short distance south-eastward of it.

Canara reef.—On this reef, discovered by the steamship *Canara* in 1881, there are many shoal heads of one and 2 fathoms; it bears S.W. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from Seil Ad-dar Kebir, and S.E. $\frac{3}{4}$ S., $4\frac{1}{4}$ miles from the northern end of Shab Mobiyet, described at page 157.

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Franks reef.—This reef, discovered by the *Canara* in 1881, is assumed to be about one mile long; the sea was observed to break on it. Its centre bears N. by E. $\frac{1}{4}$ E. about $3\frac{1}{2}$ miles from Shab Muncar, and S.S.E. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles from Seil Ad-dar Kebir. This shoal was not seen by H.M.S. *Myrmidon* during her survey of this locality in 1884.

Chiltern patches.—Chiltern patch, a small shoal with a depth of 2 fathoms, lies with Shab Muncar bearing N.N.W. $\frac{1}{4}$ W. $4\frac{1}{4}$ miles. A similar patch of the same depth and name (discovered in 1890) is situated

6 miles W. by N. $\frac{3}{4}$ N. from Barr Musa Seghir. Five miles eastward of the former of these patches there is a bank about 3 miles in extent, with soundings of 11 and 12 fathoms.

Barr Musa Seghir, in lat. $19^{\circ} 3' N.$, long. $38^{\circ} 11\frac{1}{2}' E.$, and 10 miles S. $\frac{1}{2}$ E. from Barr Musa Kebir, is an island about half a mile long, composed of coral and sand; it is steep-to, and close to its southern side are 238 fathoms.

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Andi Seli island, in lat. $18^{\circ} 54' N.$, long. $38^{\circ} 36' E.$, and $17\frac{1}{2}$ miles E. by S. from Taimashiya, is a low circular coral island half a mile in diameter; N.W. $\frac{3}{4}$ W. about 2 miles from this island, is a patch of rocks.

Lokhah island.—About S.E. $\frac{1}{2}$ S. 5 miles from Andi Seli is Lokhah, also a low circular island about half a mile in diameter, with 67 fathoms at a short distance from its southern side.

Shab Lokhah is a breaking reef, above a mile in extent, $8\frac{1}{2}$ miles S.W. by W. from Lokhah island.

Masámarhu islands.—E. by S. $5\frac{1}{2}$ miles from Lokhah is the island of Masámarhu, in lat. $18^{\circ} 50' N.$; and S.S.E. $\frac{1}{2}$ E. 2 miles from it, is Karam Masámarhu. These islands are at the north-eastern corner of the Sawákin group; both are low and consist of sand and coral, with bushes on them, and both are steep-to and surrounded by very deep water; they afford no anchorage whatever.

CAUTION.—In the navigation of this part of the Red sea, the mariner is again specially cautioned to be on his guard against the effect of cross currents; *see* p. 20. The strength and direction of these currents varies extremely, and the knowledge of their existence should induce great vigilance and attention.

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Soundings.—From Tella-tella Seghir to these islands, the soundings are regular, increasing from 7 to 28 fathoms, and then gradually decreasing to 20 fathoms, after which they are irregular towards the islands; the bottom, rocks and sand. There appears to be a barrier shoal of from

a mile of the shore reef, except one 4-fathoms patch N. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles from South-west islet. There are three other islets on this reef, one, a sandy islet 8 feet high, similar to South-west islet $1\frac{1}{4}$ miles N.E. by E. from it; the two others have no bush.

There is no navigable passage through this group of reefs.

Channel between Shab-ul-Shubuk and Kad Etwid reefs.—The channel between the Kad Etwid reefs and Shab-ul-Shubuk is nearly $3\frac{1}{2}$ miles wide, but it is encumbered by shoals with from 4 to 7 fathoms. Besides the shoals already mentioned S. by E. $\frac{1}{2}$ E. of South-west islet, there exist two heads of $2\frac{1}{2}$ and $3\frac{1}{2}$ fathoms, coral, bearing respectively S.E. by E. $\frac{1}{2}$ E. 6 miles and S.E. by E. $\frac{5}{8}$ E. 9 miles from the same islet. The former is the Middle shoal and is marked by a buoy; the latter is that already described at page 161 as lying north-westward $1\frac{1}{4}$ miles from Corner reef of Ul-Shubuk.

Middle shoal buoy.—A can buoy painted red and white in horizontal stripes, and surmounted with staff and triangle, is moored on the Middle shoal, the westernmost of the two shoals just mentioned; if in position, it may be passed one cable distant on either hand, but the fairway lies northward of it. The buoy is, however, very liable to be washed away, *see* page 158.

Directions.—When approaching the entrance to the southern channel for Sawákin, inside the Sawákin group, great care is necessary as the currents are strong and very irregular; the approach should be so timed as to make sure of having broad daylight before any of the islands or shoals are neared, unless trustworthy astronomical observations have been obtained through the night; *see* caution, page 172. From Tella-tella Seghir island or from the South-eastward, pass about 3 cables north-eastward of the reef at the south-east end of Ul-Shubuk (which has a beacon on its south-east corner); then, following the track recommended on Admiralty chart No. 81, steer N.W. by W. $3\frac{3}{4}$ miles until Kad Hogít beacon bears N.N.E. $\frac{1}{4}$ E. The course will then be N.N.W. $\frac{1}{2}$ W. for $9\frac{1}{4}$ miles, and when Corner reef beacon bears S. by W., the course should be altered to W. $\frac{1}{2}$ N. to pass the Middle shoal buoy and to make the South-east reef of the Kad Etwid group.

Skirting the latter reef, which almost always breaks, at the distance of one mile, to avoid the spit extending southward of it, a westerly course carries a vessel to the shore-fringing reef which may then be followed all the way to Sawákin, keeping it at a distance of about 4 cables.

The dark hill standing in the foreground W. $\frac{1}{2}$ S. of this channel will with Waratab, be found useful for bearings.

Etwid islet is sandy, 9 feet high, has bush at its north-eastern end, and is encircled by a reef; it is visible from the southern approach and is

See chart, No. 81.

useful for determining the ship's position. A breaking reef lies $1\frac{1}{2}$ miles E.S.E. from it, and two more, which also break, lie $4\frac{1}{2}$ miles E. by N. from the islet; shoal water extends northward of the latter.

Etwid islet bears N.E. $\frac{1}{4}$ E. $5\frac{3}{4}$ miles from South-east reef of the Kad Etwid reefs, and vessels should not pass between them.

ANCHORAGES southward of Sawákin.—**Mersa Haddhu**, 12 miles southward from Sawákin, affords anchorage and landing for large boats and dhows. The entrance is about 2 miles S.W. by W. from South-west islet of the Kad Etwid group; it is only 150 feet wide and the depth is 2 fathoms just inside; the least water in the entrance is 7 feet. The inner harbour, called **Mersa Likák Hindi**, is 2 miles long with depths of from 3 to 6 feet; it has an opening at its northern end fit only for boats. There are said to be wells of indifferent water here.

Mersa Entabil and the northern entrance to Mersa Likák Hindi, both lying between Sawákin and Mersa Haddhu, are but breaks in the reef fit only for small boats.

Mersa Sheikh Ibrahim.—The entrance to this anchorage is 16 miles S. by E. from Sawákin; entering on a W. $\frac{1}{2}$ N. course, it gradually curves during the $8\frac{1}{2}$ cables of its length to W.S.W. and then opens out, southward, to an anchoring space $4\frac{1}{2}$ cables in length by $1\frac{1}{2}$ cables wide, good holding ground. The entrance channel is from one cable to half a cable in width; and the depths, from 17 fathoms at the mouth to 9 or 10 fathoms when half way in, and $5\frac{1}{4}$ fathoms at its inner end between Cairn point on the North and the reef on its southern side. The anchorage within has from $4\frac{1}{2}$ to 6 fathoms.

The highest part of mount Gumbereid on with a notch in the distant hills bearing W. $\frac{1}{2}$ N., leads up to the entrance; enter on this bearing and keep in mid-channel, anchoring about one cable beyond Cairn point.

On the north-western shore of this harbour, there are some high mangrove bushes, near which abundant traces of antelope, gazelle, &c., have been seen.

Mersa Sheikh Sad, 19 miles from Sawákin, is a well-protected reef harbour about 2 miles long, with from 3 to $4\frac{1}{2}$ fathoms in the first mile, decreasing to 6 or 7 feet towards the head. There is room for a short vessel to lie at single anchor just inside the entrance, but farther in a stern anchor is required. The entrance is in a westerly direction, curving to N.N.W. about 4 cables within the entrance, the principal length of the harbour lying parallel with the shore; its entrance is partly obstructed by shoals which can be seen under favourable circumstances.

The outer shoal in the entrance, with 6 feet water, is a mushroom shaped coral head and cannot be easily seen, but may be avoided by keeping close

to the reef on the northern side of entrance, which reef is dry in patches. There is no good landing place in this Mersa as the water shoals gradually and boats ground about 50 yards from the shore. The country in the neighbourhood appears to be uninhabited and is thickly covered with brushwood.

Vessels approaching this Mersa from the northward should keep the shore reef on board, avoiding projecting horns. The ground eastward is unsounded and many patches of discoloured water have been seen in that direction.

The Inner channel passing in-shore of Shab-ul-Shubuk commences just southward of Mersa Sheikh Sad; it is, however, very intricate and unsurveyed, and should not be used unless necessity requires it, *see* note, p. 160.

Sand-hills point is nearly 13 miles S.E. by E. from Mersa Sheikh Sad, and has large sand-hills on it about 60 feet in height; in the bight between are two islands. Reefs extend from the point 2 miles in a N.E. and 4 miles in a N.W. direction.

Melita point, half a mile southward of which the land covered with scrub rises to a height of about 30 feet, is situated $2\frac{1}{2}$ miles E. by N. $\frac{3}{4}$ N. from Sand-hills point, and forms the west extreme of Mersa Makdah; hence there is a road to El Teb and Tokar.

RAS MAKDAH, 32 miles S.E. by S. from Sawákin, is a low point marked by a sandy ridge 37 feet high and a quarter of a mile long, the most conspicuous of the low sand-hills in the vicinity; three small islands only 5 to 8 feet above water lie northward of the point, and shoal ground extends $1\frac{1}{2}$ miles off-shore.

Mersa Makdah is the bight enclosed between the south-eastern part of Shab-ul-Shubuk and Ras Makdah. Anchorage in 6 to 8 fathoms, sand and mud, may be found over the northern portion of the bight under the lee of the reef, but the southern part is blocked by the shoals extending $1\frac{1}{2}$ miles northward from Ras Makdah.

Eagle anchorage.—At the south-western part of Mersa Makdah, there is good anchorage in 5 fathoms, sand, 6 cables south-eastward of the beacon on the east end of Eagle island reef. No supplies can be got at this anchorage, but fish are plentiful and may be caught with the seine on the sandy shore just south of Eagle island.

Beacons are placed as follows in Mersa Makdah:—Shubuk beacon, on the south point of the reef at south-east end of Shab-ul-Shubuk (*see* page 160); Sumar beacon, close to the west end of Sumar island; Point beacon, on the north-eastern edge of a detached reef, and one mile N.E. $\frac{3}{4}$ E. from Melita point; and Eagle beacon on the outer end of the reef extending eastward from Eagle island.

See chart, No. 81, and plan, No. 1,948.

Rambler Shoal extends $4\frac{1}{2}$ cables in a N.N.W. and S.S.E. direction and is 2 cables wide, with a least depth upon it of 3 fathoms, coral, and $4\frac{1}{2}$ fathoms around; from it, the sand cay on the detached reef at the south-eastern extreme of Shab-ul-Shubuk bears N. by E. $\frac{1}{2}$ E. $1\frac{1}{3}$ miles.

Fairway patch.—A circular coral patch of 4 fathoms, 2 cables in diameter, lies with the sand cay on the south-eastern extreme of Shab-ul-Shubuk bearing N. $\frac{3}{4}$ W. $2\frac{1}{4}$ miles.

TRINKITAT HARBOUR (lat. $18^{\circ} 40' N.$, long. $37^{\circ} 44' E.$).—About 2 miles south-eastward of Ras Makdah is Ras Makdam, the northern entrance point of the inlet forming the harbour of Trinkitat, about 10 miles inland from which is the fortified town of Tokar, occupied by the Egyptians, and commanding a richly productive district. The entrance to Trinkitat is not easily distinguished as the coast is low and sandy. Off the entrance is the extensive reef Katat Kennasha, which is steep-to, nearly awash, and, being always visible, forms the best mark for recognizing the position of Trinkitat. Between this reef and the entrance is a shoal, 2 cables long, having 19 feet least water near its southern end.

At present a white convict hulk, moored at the head of the harbour, is the best mark when making the place from the southward; a stone blockhouse for the convict guard on the shore at the south-west part of the anchorage is also a useful mark.

There is good anchorage outside the harbour in about 6 fathoms, under shelter of Katat Kennasha.

The harbour opens to the north-east, is about half a mile wide, extends three-quarters of a mile to the southward, has a depth of 4 fathoms, and is capable of accommodating twenty vessels drawing from 18 to 21 feet; the holding ground is good. The shores of the harbour are sandy with low bushes; a sandy plain, flooded at times, extends some distance inland. In the south-eastern corner of the harbour is the opening into a large shallow lagoon.

Entrance.—The entrance is between Ras Makdam and South point, bearing from each other N. by W. and S. by E. 5 cables. A spit, on which there are from 5 to 12 feet, extends $3\frac{1}{2}$ cables northward from South point with 18 feet at its northern extreme; this sometimes breaks in the centre at its shoalest part. A coral shoal also extends $1\frac{1}{2}$ cables from the northern shore with from 13 to 17 feet water at its extreme. The entrance between the shoals is, therefore, little more than half a cable wide. Two leading beacons are erected on the western shore of the harbour 120 yards apart; they consist of poles 35 feet high, the north-eastern one, close to the shore, being surmounted by a diamond-shaped cage; the south-western pole by a square cage. The beacons in line S.W. $\frac{7}{8}$ W. lead in between the shoals in 24 feet, least water. Should the

beacons be missing, a stranger should buoy the channel before attempting to enter.

Communication.—A railway to Tokar is in course of construction. Trinkitat is in telephonic connection with Tokar; thence by telegraph with Kassala, Khartum, Massawa, Sawákin, &c.

Katat Teronbo.—About 4 miles S.E. from Ras Makdam, the northern entrance point of Trinkitat harbour, is the rocky shoal Katat Teronbo; it is steep to on its seaward side but shoals gradually towards the shore, between which and it is a $3\frac{1}{2}$ -fathoms channel, where anchorage may be found in case of need.

The coast.—This part of the coast is low, barren, and sandy, full of salt-water swamps, and in some parts covered with bushes, but no fresh water is known to be procurable.

Ras Asis.—From the entrance to Trinkitat, the coast trends south-easterly about 12 miles to a slightly projecting point, and from thence S.E. $\frac{3}{4}$ E. 14 miles to Ras Asis, a low sandy point, marked by a cairn of loose stones, in lat. $18^{\circ} 26\frac{1}{2}'$ N., long. $38^{\circ} 7\frac{1}{2}'$ E., from which point, a rocky shoal extends some little distance, and north-eastward of which is a 4-fathoms patch $1\frac{1}{2}$ miles from the shore, with uneven soundings of from 5 to 15 fathoms for some distance outside it. Between Trinkitat and the first-named projecting point there are a few sand-hills, but the shore from this point to Ras Asis is very low and sandy, and the country for several miles inland continues to be of the same description.

RAS SHAKAL.—Beacons.—Ras Shakal is 13 miles S.E. $\frac{1}{4}$ E. from Ras Asis, the coast between forming a bay receding 7 miles with depths of from 17 to 6 fathoms. The cape is marked by a substantial white stone beacon, surmounted by an iron cross, the top of which is 25 feet above the sea; it stands on the most projecting islet, northward of the cape, which uncovers at low water. At $1\frac{3}{4}$ miles southward of this beacon is a small beacon on a mound near the sea-shore, merely a small cairn of stones very difficult to be seen from seaward; it is $1\frac{1}{4}$ miles N.W. by W. $\frac{1}{4}$ W. from Ras Istahi at the entrance to Khor Nowarat.

Between Ras Shakal and the Karb islands, distant 10 miles N.E. by E., the channel is clear with from 29 to 50 fathoms, but at that distance E. $\frac{1}{2}$ N. is a large patch with from 6 to 10 fathoms. There are soundings of from 6 to 7 fathoms at about $1\frac{1}{2}$ miles from the beacon. A safe depth in which to pass Ras Shakal is 30 fathoms (not less), or 4 miles distant.

Barrat Dodam, $7\frac{1}{2}$ miles S. $\frac{3}{4}$ W. from Ras Asis, is a narrow tongue of land with a reef on which are some islets.

Akik Seghir.—Anchorage.—At $5\frac{1}{2}$ miles S.E. $\frac{1}{2}$ E. from Barrat Dodam, is this small island at the head of the bay, from whence

to Ras Shakal the bearing and distance is N.E. by E. $\frac{1}{2}$ E. $6\frac{1}{2}$ miles. Two other small islets lie eastward of Akik Seghir, and a 2-fathoms patch a short distance north-eastward of the point. This island, with a small tongue of land westward of it, affords protection to an anchorage in 5 or 4 fathoms. Half a mile from the beach are some wells dug in the sand, containing brackish water in the dry season. About one mile from the beach, in the direction of Quoin hill, are some remarkable ruins in a straight narrow line, $1\frac{1}{2}$ miles in length, and from 20 to 60 feet wide; they are on raised ground, sloping from the centre to either side, and there are many graves.

Akik.—The town of Akik is just southward of these islands. Supplies, including sheep and bullocks, may be obtained. There is a caravan route from Akik to the interior.

Amarat islands.—From 2 to 3 miles westward of Ras Shakal, in the entrance of the bay, are the two Amarat islands, low and sandy, with a few bushes on them, standing on a coral reef; a depth of 4 fathoms extends about a mile north from the east end of the eastern island. Another small islet lies on the same reef southward of the eastern island; a little beyond it is a rocky patch. Between these and the land, on the south-eastern side of the bay, is a passage to Akik Seghir.

Diamond shoal.—A coral shoal, a mile long in a N. by W. and S. by E. direction, on the southern edge of which H.M.S. *Diamond* touched in the year 1878, lies about 2 miles northward of the eastern Amarat island. The least water found was 14 feet, with 12 fathoms close-to.

* At one to $1\frac{1}{2}$ miles N. by W. $\frac{3}{4}$ W. from Diamond shoal, a crescent-shaped shoal was observed by H.M.S. *Melita* (1896), with apparently a depth of $2\frac{1}{2}$ fathoms upon it.

KHOR NOWARAT is, without exception, the finest bay in the Red sea. Its breadth from Ras Istahi, the north-western point, marked by a small white conical stone beacon about 6 feet high at the water's edge, to Ras Farajin, is 4 miles, and it is the same distance from Farajin island to the head; but, the island of Bahdur occupies a large space in the centre of the bay.

Farajin island, 20 feet high, is connected with Ras Farajin by a reef, on which are two or three small islets, and through which native boats find a channel; there are also some small islets between Farajin and Bahdur island. The length of Farajin island, including Shatira island, joined to its north-western end by a reef, is nearly $3\frac{1}{2}$ miles, and the entrance to the bay is between Ras Istahi and Shatira island.

The coast surrounding the bay is low and sandy, but high land approaches within 5 miles of the shore.

See plan of Khor Nowarat, on chart, No. 8d.

Fronting the entrance is a chain of low sand and coral islands, which effectually keep out all swell or sea; they stand on coral reefs, and a few bushes or small trees grow on some of them. The northernmost of these is Guban, a coral island 25 feet high and half a mile off-shore, $1\frac{1}{2}$ miles S.E. of Ras Shakal; on the low eastern part of this island are two heaps of coral stones, now overgrown with grass, and therefore not easily seen. South-eastward of Guban are the Hajar islands, 20 feet high, three in number, and all on one reef, covering a length of 2 miles N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E. There are also two small islands in a swampy bay, inside and westward of Ras Istahi.

Entrance.—Depths.—The only entrance for ships is between Guban and the Hajar islands, where the depths are reported to be from 3 to 11 fathoms. Off Ras Istahi, a shoal of 3 fathoms extends $2\frac{1}{2}$ cables, and off the western end of Shatira island is a shoal easily discernable; the channel here is about 4 cables wide, with from $4\frac{1}{2}$ to 7 fathoms water. In the outer part of the bay the depths are from 4 to 6 fathoms, mud; in the inner part, where vessels anchor south-westward of Bahdur, there are $4\frac{1}{2}$ fathoms towards the island, gradually decreasing to 3 and 2 fathoms near the mainland.

There is an entrance channel between Farajin and the Hajar islands, through which the *Benares* sailed; but it is very narrow and cannot be recommended for ships, there being only 2 fathoms in some parts. Small vessels proceeding from khor Nowarat to the southward find this a convenient channel during northerly winds, or coming into the khor from the southward with southerly winds, as it shortens the distance in and out, as well as saving the time occupied in working through the North channel.

Bahdur island is $2\frac{1}{2}$ miles long, and three quarters of a mile wide; it consists of coral rock with a low sandy plain on the western part; on the eastern part it is rather woody. The town of Akik Kebir on the south-western part of Bahdur is a small place, garrisoned by about 100 Egyptian irregulars; it has a considerable trade with the coast in dhurra, cloth, calico, &c. It has a square stone mosque, and a little westward of the town, on the margin of the island opposite the ships' anchorage, in a small tomb.

Water.—About a quarter of a mile from the town are some tanks cut out of the solid rock, and a large cement tank has been constructed on the beach at the town to store water from the Egyptian condensing ship in summer if the natural supply should fail. In winter the water is very good.

No other supplies can be obtained here, but possibly bullocks and sheep might be had by opening up communications with Akik, 6 or 7 miles

See plan of Khor Nowarat, on chart, No. 8d.

distant across the isthmus separating Khor Nowarat from the deep bay north-westward of it, already described.

Tides.—It is high water, full and change, at Bahdur, at 1 h. 15 m.; the rise is $1\frac{1}{2}$ feet.

Aspect of the country.—The following is a description of the hills, as seen from Bahdur island :—

Saddle peak or Sugar-loaf is the southernmost detached hill of the near range southward of Bahdur, and resembles a sugar-loaf. Hummock peak is a remarkable rugged-topped hill, south-westward of the former. Bluff peak is north-west of the last and in the same range, being about 10 miles from the beach, and is the highest northern part of the mountains south-westward of Bahdur. Chimney hill is a high and remarkable mountain on the most distant range in the same direction as the last. Quoin hill is a small peak in the northern part of the near high range westward of Bahdur.

Landmark.—Mound hill is a low double-topped hill by itself, westward of the near high range of land surrounding the bay; approaching the entrance to Khor Nowarat, for which it is a good mark, it looks like an island.

Directions.—The entrance of khor Nowarat is difficult to distinguish at a distance, as there are no landmarks except Mound hill, just described, and the other hills some miles in the interior. Mound hill on a S.W. by S. bearing leads towards Ras Shakal until Guban island is made out.

The entrance between Guban island and the Hajar chain is half a mile wide, with from 3 to 11 fathoms. Give a berth, in rounding it, to the spit extending $2\frac{1}{2}$ cables off Ras Istahi, and then steer to the South-west to clear the shoal off Shatira island; in passing round the western point of Bahdur, give the spit off it a berth and anchor in 4 fathoms S.W. of the town. Deeper water and more room may be had northward of Bahdur.

The SAWÁKIN GROUP of islands, shoals, and reefs, as stated at page 154, front the coast from Sawákin to Nowarat, some of the outer reefs lying more than 30 miles from the nearest shore of the mainland. Hind Kadám, in lat. $19^{\circ} 23' N.$, long. $37^{\circ} 54' E.$, with all the reefs and shoals bordering on the North-eastern approach to Sawákin, are described at pages 156–158; the island of Tella-tella Seghir, with the reefs bordering on the Southern approach to Sawákin, at pages 159–162. It now, therefore, only remains to describe the islets and dangers not included in the two passages referred to, and mainly on the eastern or seaward side of this extensive group.

Barr Musa Kebir, an island in lat. $19^{\circ} 13' N.$, long. $38^{\circ} 10\frac{1}{2}' E.$, somewhat circular in shape, with a diameter of about three-quarters of a

See charts, Nos. 8d and 8c.

mile, is composed of sand and coral, and has a few bushes upon it; it lies on the outside of the group at this part. Its northern point bears S.E. $\frac{3}{4}$ E. 18 miles from Hind Kadám. There is a reef about a mile north-westward of the island, and no bottom at 100 fathoms close to its southern side.

Barakut island, West about 9 miles from Barr Musa Kebir, is a low sand and coral island without anchorage, there being no bottom at 135 fathoms close to its southern side. Reefs extend from the eastern and western ends of this island.

Reefs.—There are four large breaking reefs, extending nearly 5 miles northward of Barakut island; the second is called Shab Barakut, and the northernmost Shab Kutb. The latter bears W.N.W. 10 miles from Barr Musa Kebir, and S.E. by S. 8 miles from Hind Kadám.

Seil Ad-dar Kebir island, bearing S.W. by S. $11\frac{1}{4}$ miles from Hind Kadám, and W. $\frac{7}{8}$ N., 11 miles from Barakut, is a small sand and coral island, 26 miles E. $\frac{5}{8}$ N. from the entrance to Sawákin; a reef extends half a mile northward from its north point, but there is no bottom at 120 fathoms a short distance south-eastward of it.

Canara reef.—On this reef, discovered by the steamship *Canara* in 1881, there are many shoal heads of one and 2 fathoms; it bears S.W. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from Seil Ad-dar Kebir, and S.E. $\frac{3}{4}$ S., $4\frac{1}{4}$ miles from the northern end of Shab Mobiyet, described at page 157.

Three small reefs, each about a cable in extent, lying in a line east and west, are situated:—the western one 6 cables S. by E. from Canara reef, with the eastern reef bearing E. $\frac{1}{8}$ N., distant $4\frac{1}{2}$ cables from it.

Shab Muncar is a small crescent-shaped breaking reef, open on its southern side; in the summer of 1884, it had a sand bank near its western horn. It bears S. $\frac{1}{2}$ E. 6 miles from Seil Ad-dar Kebir. In 1886 a shoal patch about 8 cables long east and west, was reported to lie three-quarters of a mile south-eastward of Shab Muncar.

Pender reef, about a mile long east and west, on which the least water is $3\frac{1}{4}$ fathoms, lies N.N.W. $\frac{1}{4}$ W. $1\frac{6}{10}$ miles from the centre of Muncar.

Franks reef.—This reef, discovered by the *Canara* in 1881, is assumed to be about one mile long; the sea was observed to break on it. Its centre bears N. by E. $\frac{1}{4}$ E. about $3\frac{1}{2}$ miles from Shab Muncar, and S.S.E. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles from Seil Ad-dar Kebir. This shoal was not seen by H.M.S. *Myrmidon* during her survey of this locality in 1884.

Chiltern patches.—Chiltern patch, a small shoal with a depth of 2 fathoms, lies with Shab Muncar bearing N.N.W. $\frac{1}{4}$ W. $4\frac{1}{4}$ miles. A similar patch of the same depth and name (discovered in 1890) is situated

See chart, No. 81.

6 miles W. by N. $\frac{3}{4}$ N. from Barr Musa Seghir. Five miles eastward of the former of these patches there is a bank about 3 miles in extent, with soundings of 11 and 12 fathoms.

Barr Musa Seghir, in lat. $19^{\circ} 3' N.$, long. $38^{\circ} 11\frac{1}{2}' E.$, and 10 miles S. $\frac{1}{2}$ E. from Barr Musa Kebir, is an island about half a mile long, composed of coral and sand; it is steep-to, and close to its southern side are 238 fathoms.

Taimashiya island, 9 miles S.E. by S. from Barr Musa Seghir, is a low sand and coral island, where, in case of necessity, anchorage may be obtained. It is surrounded by a reef, and there are from 6 to 12 fathoms near its southern side, but the island is too small to afford any protection from swell.

Andi Seli island, in lat. $18^{\circ} 54' N.$, long. $38^{\circ} 36' E.$, and $17\frac{1}{2}$ miles E. by S. from Taimashiya, is a low circular coral island half a mile in diameter; N.W. $\frac{3}{4}$ W. about 2 miles from this island, is a patch of rocks.

Lokhah island.—About S.E. $\frac{1}{2}$ S. 5 miles from Andi Seli is Lokhah, also a low circular island about half a mile in diameter, with 67 fathoms at a short distance from its southern side.

Shab Lokhah is a breaking reef, above a mile in extent, $8\frac{1}{2}$ miles S.W. by W. from Lokhah island.

Masamarhu islands.—E. by S. $5\frac{1}{2}$ miles from Lokhah is the island of Masamarhu, in lat. $18^{\circ} 50' N.$; and S.S.E. $\frac{1}{2}$ E. 2 miles from it, is Karam Masamarhu. These islands are at the north-eastern corner of the Sawakin group; both are low and consist of sand and coral, with bushes on them, and both are steep-to and surrounded by very deep water; they afford no anchorage whatever.

CAUTION.—In the navigation of this part of the Red sea, the mariner is again specially cautioned to be on his guard against the effect of cross currents; see p. 20. The strength and direction of these currents varies extremely, and the knowledge of their existence should induce great vigilance and attention.

Tella-tella Kebir.—E. $\frac{1}{2}$ N. 8 miles from Tella tella Seghir, described at page 159, is the southern end of the reef on which are the Tella-tella Kebir islands. These are three low sand and coral islands, having at a distance the appearance of being only one; they are covered with bushes, and the extent of the reef on which they stand is 3 miles North and South by about 2 miles wide.

Soundings.—From Tella-tella Seghir to these islands, the soundings are regular, increasing from 7 to 28 fathoms, and then gradually decreasing to 20 fathoms, after which they are irregular towards the islands; the bottom, rocks and sand. There appears to be a barrier shoal of from

4 to 7 fathoms surrounding these islands at the distance of one mile, within which at 5 cables from the islands are 10 or 11 fathoms. A spit about 8 cables in length extends from the South extreme of the southern islet.

Falcon shoal.—A shoal, over which H.M.S. *Falcon* passed, lies about $3\frac{1}{2}$ miles southward of Tella-tella Kebir; from $6\frac{1}{2}$ to 7 fathoms were obtained for a distance of half a mile. There are from 25 to 30 fathoms around.

Dar-ah-Teras is a low sandy coral island, about 14 miles S.E. $\frac{1}{4}$ E. from Tella-tella Seghir, and N.N.E. $\frac{3}{4}$ E. 12 miles from Ras Asis; it has 23 fathoms close to it, and 18 fathoms midway between it and the mainland. A reef extends about a mile eastward of Dar-ah-Teras; E.S.E. 6 miles from the island a dangerous reef has been said to exist, which later reports place only 3 miles from Dar-ah-Teras.

Akrab and Karb islands rise from a dangerous coral reef, 7 miles in length north and south, by $5\frac{1}{2}$ miles across, including patches in its neighbourhood. There are on this reef six small islands, or more correctly sand and coral banks, on which, when there is any swell, the sea breaks heavily. The three northermost are called the Akrab islands; the two next, southward of them, the Karb islands; and the easternmost, Abu Marina island. The water is very shoal in parts on this reef, caused by pinnacle coral rocks with no bottom at 40 fathoms between them, as also close to the westward of Karb island. The northern Akrab island is $13\frac{1}{2}$ miles N.E. from Ras Shakal on the mainland; the southern Karb island and Abu Marina bear N.E. by E. $\frac{1}{2}$ E. from the same Ras at the respective distances of 12 and $14\frac{1}{2}$ miles; and, Abu Marina bears about West 12 miles from Derráka island.

Shoals.—About 3 miles S. by W. from Abu Marina is a reef, on the Akrab bank, on which H.M.S. *Cyclops* struck in 1859. About 4 miles southward of the Karb islands, and from 6 to 10 miles eastward of Ras Shakal, is a rocky bank of from 7 to 16 fathoms, with 40 fathoms between it and the shore; and 3 or 4 miles farther in the same direction and 5 miles southward from Abu Marina, there is a bank with from 5 to 12 fathoms, probably an extension of the Akrab reefs, and no bottom very close to with 30 and 40 fathoms.

CAUTION.—Current.—To avoid the shoals southward of the Akrab islands, a ship should pass the coast in the neighbourhood of Ras Shakal at a distance of 4 miles, and not shoal the water towards the shore into less than 30 fathoms. The currents also in this neighbourhood are extremely variable and sometimes very strong. Lieut. C. G. S. Eeles, of H.M.S. *Dolphin*, reported that in February, 1887, from a fixed position off Deresa cove at 6 p.m. on the 17th, courses were shaped to place the ship 10 miles N.N.E. $\frac{3}{4}$ E. from Ras Kasar shortly after daylight of the

See chart, No. 8d.

following morning; at which time, however, Abu Marina and the Karb islands were made on the port bow, the ship having been set N.N.W. $\frac{1}{4}$ W. 19 miles in 12 hours, and there was reason to believe that the greater part of the set occurred as the islands were approached. It would appear to be very dangerous to near the channel from the southward until broad daylight, unless certain of the ship's position and especially of her latitude.

Ed dom esh Sheikh island, the easternmost of the Sawákin group, is in lat. $18^{\circ} 37' N.$, long. $38^{\circ} 50\frac{1}{2}' E.$; it is low, thinly covered with bush, and surrounded by a reef with 90 fathoms close to; it lies S. by E. $\frac{1}{4}$ E. $11\frac{1}{2}$ miles from Karam Masámarhu. At $3\frac{1}{2}$ miles W. by S. of Ed dom esh Sheikh is the islet Gharb Abi Isa. About $1\frac{1}{2}$ miles E.S.E. from the latter and 2 miles south-westward from the former, is a large reef, awash, about $1\frac{1}{2}$ miles in extent in a N. by E. and S. by W. direction, and with no soundings at 60 fathoms close to on its eastern side.

Dahret ed-dak-hilat, another small islet surrounded by a reef, with no bottom at 90 fathoms close to it, bears S.W. $\frac{1}{2}$ S. $4\frac{3}{4}$ miles from Ed dom esh Sheikh. At $1\frac{1}{2}$ miles East of Dahret ed-dak-hilat is a coral reef, apparently steep-to, about 3 cables long north-east and south-west, less than a cable wide, and with 6 feet near its north-eastern extreme, where it occasionally breaks.

Gharb Miyun bears S. $\frac{1}{2}$ W. 7 miles from Ed dom esh Sheikh; it is surrounded by a reef, and has foul ground extending $3\frac{1}{2}$ miles eastward of it. At 2 miles W. by S. from Gharb Miyun is Miyun islet also surrounded by a reef with 160 fathoms close to its south-western side.

Derráka.—W. by S. $\frac{1}{2}$ S. 4 miles from Miyun is Derráka island, surrounded by a reef, and having more than 80 fathoms close to the northward of it. Nearly a mile off its north-western side is a shoal about 2 cables long, on which the sea breaks heavily; the fringing reef of Derráka appears to extend some distance towards this reef.

Dha-l-ghab island, encircled by a reef, lies 5 miles N.W. by N. from Derráka; and, E.N.E. $4\frac{1}{4}$ miles from Dha-l-ghab is Isa Abi, another small island surrounded by a reef.

Dahret Abid island, in lat. $18^{\circ} 21' N.$, long. $38^{\circ} 46' E.$, is the southernmost of the Sawákin group, bearing N.E. $\frac{1}{2}$ E. 20 miles from the point of Abu Yabis on the mainland; S.S.W. $\frac{1}{4}$ W. 9 miles from Gharb Miyun; and, S.E. by E. $\frac{3}{4}$ E. 15 miles from Abu Marina. These last named nine islands at the south-eastern corner of the Sawákin group are all low coral and sandy spots, from half a mile to two or three hundred yards across with a few bushes growing on them.

Safinat shoal bears N.N.E. $\frac{3}{4}$ E. about 4 miles from Dahret Abid. It is a small one-fathom patch, with upwards of 40 fathoms close to the westward of it.

Anchorage.—As a rule, the water is smooth inside the islands of the Sawákin group, and anchorage may be had in from 10 to 25 fathoms in almost any part between Ras Makdah and Ras Shakal. It must be remembered by those navigating these waters that the buoys and beacons are liable to be washed away.

See chart, No. 8d.

CHAPTER V.

WEST COAST OF RED SEA FROM KHOR NOWARAT TO
THE STRAIT OF BAR-EL-MANDEB.(Lat. $18^{\circ} 12' N.$ to lat. $12^{\circ} 25' N.$)

 VARIATION IN 1900 - - - $3^{\circ} 30' W.$

This tract of coast, on which the Italians have acquired territory and formed settlements within the last few years, borders on the Abyssinian highlands, but is generally low and arid, gradually rising through the Dankali province, a space of about 40 miles to the first of the three series of plateaux of which Abyssinia is formed. These mountains, which are among the highest in the world, have, generally speaking, a peculiarly abrupt and precipitous appearance. No rivers worthy of mention empty themselves into the Red sea; the two most considerable on the eastern side of Abyssinia, the Hamazo and the Hawash, being swallowed up in the sands before reaching the coast, after having run a course of upwards of 240 miles.

Though Abyssinia is rich in productions, comparatively little intercourse is carried on with the outer world by way of the Red sea; Massawa, now an Italian possession, affords the chief and almost the only outlet for its trade in this long line of coast. In the low coast region of Dankali, citrons, oranges, and sugar-cane are produced. In the same place are to be found elephants and rhinoceroses.

The Inner channel on this side of the Red sea is continued in the North and South Massawa channels, lying westward of the Dahalak group of islands, and fully described in the present chapter.

The Coast from Nowarat to Massawa is almost devoid of easily recognizable landmarks. Brassy is surrounded by trees, and generally has some dhows anchored close to the edge of the shore reef. Therauba is more easily distinguished than any other part of this coast, as it is covered with high trees extending about a mile along the shore, and there are no other trees northward or southward of it for a distance of 20 miles each way.

 See chart, No. 8d.

From Nowarat, the coast trends about S.E. 15 miles to Ras Abu Yabis, and is much broken up. Southward of Abu Yabis, near the shore, are some conspicuous mountains, named according to their peculiarities of form, as Round hill, &c. The coast fronting the hills is low.

Er-rih island is 4 miles south-eastward of Farajin island, about $4\frac{1}{2}$ miles in length north and south, and of very irregular shape. It is low and sandy on the eastern part, but on the western side are some trees and vegetation and the ruins in coral rock of the ancient Ptolemais Theron. The highest part is a mound of ruins, which is visible from Ras Abid. Many tanks were seen there by the surveying party.

There is a bay on the western side of the island, with 3 and 4 fathoms, mud, the former depth being pretty close to the island. The entrance into this bay is along by the northern side of Er-rih, passing between Farajin and the western extreme of that island; but there are only 2 and $2\frac{1}{2}$ fathoms in the entrance, on a bar formed on a continuation of the coast reef.

Ras Abid, 2 miles eastward of Er-rih, is a small sandy island, with its highest part to the eastward. It is separated from the main by a narrow channel of shoal water, affording protection for small craft, there being from one to 3 fathoms on it.

Seil Bahr is a rocky island one mile N.N.W. of Ras Abu Yabis, and north-westward of it is a rather large but low bushy island.

Ras Abu Yabis is a low bushy cape with small white sand-hills.

Ras Kasar, in lat. $18^{\circ} 2\frac{1}{2}'$ N. and $5\frac{1}{2}$ miles S.E. $\frac{3}{4}$ S. from Abu Yabis, is the northern boundary of the Italian protectorate, and is a projecting point of land, one or 2 miles southward of which is the bight or bay called Brassy, which may be known by its trees, the only ones in the immediate neighbourhood. The coast reef about here projects in places nearly 2 miles off-shore, with breakers; and, within the outer part, between the patches, are 3 or 4 fathoms, where dhows anchor. The shore is low and sandy, backed by high land.

Mandalu is 18 miles S.S.E. of Ras Kasar; there is at this place a very small bay between the points of the coast reef, where boats anchor. The shore hereabout is low and swampy but backed by high land, and a little within the beach is a salt plain, where the Bedouins come down with their camels to procure that article.

Therauba is a low projecting point 7 miles S.E. by S. from Mandalu; as previously remarked, it is distinguished from other parts of this coast by the high trees growing along the shore for about a mile, there being none elsewhere for at least 20 miles in each direction. From Therauba,

the coast trends S. by E. $\frac{3}{4}$ E. 12 miles and then S. $\frac{3}{4}$ E. 34 miles to Karn Adaf, all low barren sand, backed by high distant mountains.

Soundings.—A bank with from 8 to 40 fathoms, commencing about $3\frac{1}{2}$ miles north-eastward of Ras Kasar, extends from thence upwards of 40 miles in a direction parallel with the coast, at an average distance of 4 miles from it, with deep water inside; from the southern end of this bank to the parallel of Karn Adaf, the bottom is very irregular to a distance of 8 miles from the shore, where as little as 9 fathoms may be struck, and 100 fathoms close to it. A rock has been reported to lie about 7 miles off shore in about lat. $17^{\circ} 7' N.$ With such irregularities of depth, it might be expected that further examination of this vicinity would result in the discovery of many hitherto unknown dangers, and that such has been the case should induce the utmost vigilance on the part of those navigating in these waters.

King Arthur shoal.—The steam-vessel *King Arthur* in 1889 reported striking on a shoal with a depth of about $2\frac{1}{4}$ fathoms in the North Massawa channel approach in approximately lat. $17^{\circ} 10' N.$, long. $39^{\circ} 10' E.$ This shoal was unsuccessfully searched for by H.M.S. *Stork* in 1892 and again in 1897, the least water obtained being 9 fathoms in approximately lat. $17^{\circ} 6' N.$, long. $39^{\circ} 6' E.$ The bottom was found to be very irregular, and it is probable therefore that a small rocky head does exist somewhere hereabouts.

Gannet bank, discovered in 1886, and subsequently examined by H.M.S. *Stork* in 1897, is in lat. $17^{\circ} 0' N.$, long. $39^{\circ} 12\frac{1}{2}' E.$, with Karn Adaf point bearing W.S.W. 10 miles from its shoalest spot of $3\frac{3}{4}$ fathoms. The shoal is about 6 cables in extent, north and south, and 3 cables in breadth, within the 5-fathoms line, and is of sand and coral. The bottom was plainly seen from H.M.S. *Gannet*; its position is not, however, always indicated by discoloured water, but with a current making over it, a swell and ripple are apparent.

From the shoalest part of the Gannet bank, the north end of Karn Adaf saddle, in line with Victoria peak bears W. $\frac{5}{8}$ S.; and the Paps, three conspicuous hills, S.W. $\frac{1}{4}$ S.

During the examination of this bank, the current was found to be setting over it in a north-westerly direction at about three-quarters of a mile an hour.

Saunders reef, originally reported as seen breaking, 1893, is of coral foundation, and about 2 cables in diameter; there is a least depth upon it of 2 fathoms, with deep water close around. Approximate position, lat. $17^{\circ} 11' N.$, long. $39^{\circ} 23\frac{1}{2}' E.$

The dangerous Saunders reef, and the Gannet bank, lie in the fairway of vessels bound for the North Massawa channel.

Fawn reef.—Eastward of these shoals, and (exclusive of Saunders reef) the northernmost known shoal patches of the Dahalak bank, are the Fawn reef with 3 fathoms, in lat. $16^{\circ} 58\frac{1}{2}'$ N., long. $39^{\circ} 34'$ E., and another 3-fathoms patch $7\frac{1}{2}$ miles N.E. by N. of the Fawn reef, and 33 miles N.E. $\frac{1}{2}$ N. from Difnein island. This latter shoal was not found by the *Faen*, but it is known that there are many other patches of from 7 to 12 fathoms in different directions within a few miles of it, and all surrounded by deep water. It is a neighbourhood to be carefully avoided by the mariner. See page 198.

MASSAWA CHANNEL

The Massawa channel is the passage between the African shore of the Red sea and the coral archipelago of Dahalak, commencing in lat. $16^{\circ} 40'$ N. and ending in lat. $14^{\circ} 40'$ N.; it is 180 miles in length from Difnein island to Ras Kosar. The North Massawa channel, from Difnein to the Narrows off Hartan peninsula, is on an average about 9 miles wide, but, at the Narrows, it contracts to $2\frac{1}{2}$ miles. The South Massawa channel, from the Narrows eastward, has a breadth of about 13 miles. The soundings increase from 11 fathoms near the mainland shore to 35 fathoms near the islands.

The Massawa channels afford a convenient and safe passage, and, by the aid of the lights lately established by the Italian government, may be navigated at night with care, but much caution is requisite as the islands are low, steep-to, and not easily seen.

Mountains.—The character of the Abyssinian mountains is the same throughout the channel; flat table lands prevail, with their axes north and south, but here and there sharp peaks break the line and are good marks when known. A broad sandy plain rising gently from the sea recedes 15 or 20 miles to the foot of these great ranges, where it attains a height of over 800 feet. This plain is dotted with small hills, generally conical in shape, and whose heights above the sea are much dwarfed in appearance by the mountains behind, and by the almost imperceptible slope of the plain. This fact must be borne in mind when attempting to recognise the hills from the chart.

Round hills.—About 86 miles South of Ed dom esh Sheikh island, are the Round hills, two mountains lying in an E.N.E. and W.S.W. direction from each other; they are precipitous on their northern sides but slope gradually on their southern, and being much higher than the land in the vicinity, form good marks for a vessel approaching from the northward.

Southward of the Round hills the land is high close to the shore, with chains of hills and high mountains in the background.

See chart, No. 164.

Victoria peak, 30 miles inland and 48 miles W.N.W. from Difnein island, is a dome-shaped summit 7,400 feet high, on the northern end of a flat range, and when it can be seen, is the most easily recognisable mark about the entrance of the North Massawa channel. The peak keeps its shape from all points of view, and is higher than all other mountains near.

Should the higher peaks be hidden, the Paps may probably be made out. This is a double-peaked isolated hill, showing as three peaks in some directions, 1,150 feet high, and 11 miles from the shore, on the plain, above which it rises 600 feet. It bears W. $\frac{1}{8}$ N. from Difnein. There are other smaller hills round the Paps.

Eleven miles southward of the Paps is a group of volcanic cones; the highest is 1,120 feet in height. There are other smaller and less conspicuous hills on the plain farther South.

Winds.—In the North Massawa channel, northerly winds prevail, blowing stronger during the day than at night; inclining from the shore in the morning and veering to the North-east during the day. A low barometer (about 29·80 to 29·90) is invariably followed about two days later by a northerly wind which sometimes sets in suddenly and fresh, at other times gradually, in either case it is preceded by light clouds. The barometer at once rises and remains high as long as the wind lasts.

When southerly winds blow throughout the channel, they generally continue during the night also, blowing strong from S.E. by day, and at night veering to S.W. and falling lighter. As long as the wind is from the south-west it is remarkably dry, but, on the wind shifting to the southward or south-eastward, the wet bulb thermometer instantly rises several degrees. This strong southerly wind seldom lasts more than four days. The barometer gives no warning, but falls as soon as the wind sets in.

In the South Massawa channel, southerly winds are the most prevalent, bringing up a considerable swell, which is met as a vessel bound southward nears Shumma island, even when the wind does not blow home. The remarks as to the shifting of the wind in the North channel apply equally here.

Frequently there is a fresh south-easterly wind southward of Shumma, whilst the wind off Difnein and Harat islands is northerly.

Off Massawa, the direction of the sea breeze is generally East.

Rain.—Rain comes with northerly winds, and falls during the prevalence of these winds from the end of November to the beginning of March. The rainfall varies much.

Currents.—The direction of the currents in the Massawa channels is very variable. In January and February the south-easterly winds blowing in the middle of the Red sea are strongest, creating a southerly

surface current along this shore, much influenced, however, by the local winds in the channel and by the tidal movement.*

Tidal streams.—In the North channel, the flood stream sets to the southward; the ebb to the northward, and these movements are often very regular; but, at other times, the southerly current is only checked by the ebb and accelerated by the flood.

In the South channel, the tidal streams are difficult to distinguish. In January and February, southerly currents have been observed to prevail against southerly winds, but in March and April the current is usually to the northward. It seems, however, to be much governed by local winds, and, off Ras Kosar, has attained in the latter month, after five days' continuous south-easterly wind, a velocity of $1\frac{1}{2}$ knots to the north-west.

The tidal streams appear to meet at the Narrows off Shumma island.

Tides.—It is high water, full and change, at Difnein at about 12 h., at Massawa at 1 h., and at Ras Maurekh at 12 h. 30 m. The rise and fall of the tide varies much with the wind, but springs average about 4 feet, and neaps 3 feet.

Directions.—Vessels from the northward, bound through the Massawa channel, should shape a course to pass 15 miles eastward of Ed dom esh Sheikh island, small, low, thinly covered with bushes, and the easternmost of the Sawákin group, from whence the course hitherto recommended has been to steer for North Bluff hill, taking care to avoid the reef which extends $3\frac{1}{2}$ miles eastward of Gharb Miyun island; then to stand along the land to the southward at from 2 to 4 miles from the shore and well inside the Gannet and other off-lying shoals; the mariner is, however, cautioned that the space between the Sawákin group and Difnein island has not been closely examined, and that the shoal just named and others have been discovered in recent years, within and near this space; see page 177.

The appearance of the land and most prominent marks are described at page 178; the general prevalence of a thick haze in winter, however, renders the approach from the eastward to the entrance of the North Massawa channel by the aid of shore marks often difficult, and sometimes impossible; but, as a rule, when the haze is thickest the sky is clear, observations can be obtained, and the effect of any cross or counter current may be thus counteracted; when clouds prevail (usually with a

* H.M.S. *Hornet*, in July 1862, found a northern current of from half a knot to one knot an hour during 7 days; H.M.S. *Pantaloön*, in February 1865, experienced it setting as strongly southward for several days; and H.M.S. *Nassau*, in February 1874 found the current setting to the northward, at from half a mile to three-quarters of a mile an hour.

See chart, No. 164.

northerly wind) the land is tolerably clear, though the highest peaks may be capped.*

Anchorage.—On the mainland side, anchorage ground is abundant throughout the whole length of the channel, though in most places there is little or no protection from south-easterly winds; but the holding ground is generally good, and the space, except in the South Massawa channel, is too confined for much sea to get up. For these reasons, it is advisable to keep nearest to the mainland shore, and as each anchorage is described in detail hereafter, it is not necessary to give any further directions for the passage, beyond a general caution that the reefs off the mainland do not always show, and that the reefs on the island side are steep-to.

Order of description.—Following the order of description adopted in this work, we shall describe first the coast forming the western side of the Massawa channels, and then the islands on the eastern side.

North Bluff beacon.—A wooden, framework, triangular, pyramidal beacon, surmounted by a cross, the top of which is 56 feet above the sea, has been erected close to the coast at the foot of Black peak.

Kandellai is a small mangrove islet near the mainland, 9 miles W. $\frac{1}{2}$ N. from Difnein, and only separated from the shore by a narrow channel a cable wide. The island is not easily made out unless the vessel is close in. In this neighbourhood the coast is fringed with mangroves, and shoal water runs off for some distance, the 5-fathoms contour-line of soundings being 2 miles from the shore.

Mersa Mubarak and Mersa Ibrahim.—About $5\frac{1}{2}$ miles southward of Kandellai is Mersa Mubarak, with a small woody island close to its entrance; and 2 miles farther in the same direction is Mersa Ibrahim. These are two small boat anchorages.

From Mersa Ibrahim to Ras Harb, 45 miles distant, the coast forms a bay, the shore being sandy and bordered by jungle.

Melahat, 27 miles from Mersa Ibrahim, and its neighbourhood, is backed by salt-water swamps, where the natives procure salt, beyond which are ranges of low barren sand hills.

* In the month of February 1874, H.M.S. *Nassau*, Lieutenant-Commanding F. J. Gray, proceeding to the southward, pursued the track along the western shore. Having encountered a strong south-easterly gale when northward of Jebel Teir island, the vessel bore up, and crossing the Dahalak bank, passed northward of Awali Hutub and Awali Shaura islands, and between Abu Rabah and Kad-hu islands, thence through the Massawa channel along the western coast to the strait of Bab-el-Mandeb. In this route the *Nassau* generally anchored in the daytime, and proceeded with the land breeze at night.

The shoal patches on the Dahalak bank are, it is said, only to be detected by an experienced eye. The *Nassau* anchored on the 5-fathoms patch, in lat. $16^{\circ} 48' N.$, long. $40^{\circ} 8' E.$, and found the current running N.N.W. $1\frac{1}{4}$ miles an hour.

See chart, No. 164.

Shoals.—At 15 miles southward of Kandellai, the shore reef projects nearly 2 miles from the shore to a point where there is a 2-fathoms head. At 2 miles N.E. by E. from the 2-fathoms head is a 5-fathoms patch; also, at one mile south-eastward from the 2-fathoms head, and 2 miles off-shore, is a small patch of $4\frac{3}{4}$ fathoms. From this patch, which is about 3 miles north-eastward of Ras Kuba, White Cone hill, 460 feet high, bears N.W. by W. $\frac{1}{2}$ W., and Eutesila island N.E. by N.

On the mainland, south-westward of Sheikh ul Abu, in lat. $15^{\circ} 57' N.$, 5 miles N. by W. of Ras Turrik, and from thence southward, are some patches with 3 and 4 fathoms on them, $2\frac{1}{2}$ miles from the land. About 5 miles S.E. of these, and 3 miles eastward of Ras Turrik, are two more patches of 4 and $3\frac{1}{2}$ fathoms. Ras Harb bears from these S. by E. $\frac{3}{4}$ E. 5 miles. On this part of the coast the 5-fathoms line of soundings increases its distance from the shore to one mile.

Oreste shoal.—This shoal, discovered by the Austrian Lloyd's steam-vessel *Oreste*, lies about 2 miles eastward of Ras Harb; it is of small extent, consists of sand and coral, has $3\frac{3}{4}$ fathoms on it, and from 12 to 14 fathoms between it and the shore; from it Dohul Bahut islet bears N.N.E. $\frac{1}{4}$ E.; Anafi minaret Massawa, S. $\frac{1}{2}$ W.; and Ras Harb, West.

Ras Harb, in lat. $15^{\circ} 48' N.$, long. $39^{\circ} 25' E.$, is a low rounded sandy point, bearing from Massawa island N. $\frac{1}{2}$ W. 12 miles. There is no reef off Ras Harb, but the 5-fathoms line is from 7 cables to a mile from the shore.

Eberemi tomb, about 5 miles southward of Ras Harb and close to the shore, has a dome roof, and is a very conspicuous and useful mark to vessels from the northward. In clear weather it can be seen at a long distance, and even in hazy weather it can generally be distinguished through the haze.

Jebel Karamburra, or Round hill.—Eighteen miles W. by S. from Ras Harb is the north-western end of a range of hills 1,630 feet in height, extending about 8 miles south-eastward on the plain from this position. Although, when the higher mountains are visible, these appear insignificant, they show well when the former are obscured, and the summit at the north-western end being nearly detached, and of a bold rounded form, it makes a good landmark.

KHOR DAKHILIYA.—There is no anchorage in this neighbourhood to be compared with Massawa, except that of Khor Dakhiliya, a small but deep bay with good anchorage, on the northern side of the island which forms the northern border of Massawa harbour. The upper part of the Khor is shallow, and a reef extends from the southern point 3 cables to the northward, thus narrowing the entrance to $2\frac{1}{2}$ cables, but giving protection to the anchorage during south-easterly winds. On this reef is

See chart, No. 164, and plan, No. 460.

an islet 2 cables from the southern point, which is marked by a small beacon. Half a mile farther South is the entrance to Massawa harbour, northward of which, on Ras Abd-el-Kadir, stands that sheikh's tomb, coloured white.

A shoal with 11 feet, mud, lies with the northern point of entrance bearing N.E. by E. $\frac{1}{2}$ E. and the southern point S.E. $\frac{1}{4}$ S. A similar shoal, with the same depth, but rather smaller, lies one cable S. by W. from the above.

The anchorage is about half a mile in extent, with from 5 to 7 fathoms, mud. There is a rock above water on the spit extending from the northern side of the entrance.

MASSAWA HARBOUR, known also as Massowah, is situated in the northern part of Harkiko bay, and is a narrow creek of deep water between Massawa and Taoualoud islands on the South, and two other islands on the North which are joined to the mainland at low water; those on the south are joined to each other and to the mainland by reefs on which are causeways. The main part of the harbour, about 6 cables long, lies E.N.E. and W.S.W., and affords good holding ground in 8 fathoms, sand and mud, but has not much room. Just within the entrance, the North-west arm branches off from the main harbour with from 7 to 4 fathoms water, but is less than a cable wide in the entrance. At the head of the main harbour is a narrow navigable 5-fathoms channel into the Western arm which is a continuation for about $7\frac{1}{2}$ cables of the main harbour; this arm has from 3 to 5 fathoms water over a considerable space varying from half a cable to $1\frac{1}{2}$ cables in width; there are, however, several shoals in the middle towards the head of the arm, and the shore reefs extend a long way out. The causeway connecting Taoualoud island with the main, crosses the reef at the head of the Western arm; with strong south-easterly winds a swell sets in, and the causeways are sometimes flooded.

Entrance.—Depths.—There are from 13 to 15 fathoms water immediately outside the entrance, from 9 to 12 fathoms in mid-channel in the entrance, and from 9 to 6 fathoms in the available anchorage space in the main harbour. Reefs border the entrance points on both sides, the southern reef being the most extensive and the most difficult to see, there being 2 and $2\frac{1}{2}$ fathoms on it, 250 yards northward of Ras Mudir, the point upon which a fort stands; on the northern side, the reef surrounding Ras Abd-el-Kadir projects about a cable and is rather steeper.

LIGHTS.—On Seraglio island at the head of the harbour are shown two *fixed red* lights, which in line, bearing S. 67° W., lead into Massawa harbour midway between the buoys at the entrance. The front light is shown from a staff at the edge of the quay at an elevation of 40 feet above the sea, and is visible at a distance of 6 miles; the rear light is shown from

the terrace at the north-east angle of the Colonial palace, at an elevation of 72 feet, 126 yards from the front light, and is visible in clear weather at a distance of 9 miles.

Light-buoys.—A light-buoy, coloured red and showing a *fixed red* light is moored off the reef projecting northward from Ras Mudir, $2\frac{3}{4}$ cables N.N.E. from the fort flagstaff, and marks the southern side of the entrance to Massawa harbour. A light-buoy, painted in black and white chequers, and showing a *fixed green* light, is placed southward of the reef extending from Ras Abd-el-Kadir, and defines the northern limit of the entrance channel. These buoys are about two-thirds of a cable apart, and the leading lights in line lead midway between them. The buoys are not to be depended on, as they are liable to be washed away.

Directions.—Bring the leading marks in line by day (lights by night) bearing S. 67° W., and pass midway between the black and white chequered buoy (showing *green* light) marking the edge of the shore reef on the starboard hand, and the red buoy (showing *red* light) on the port hand, and from thence steer up the centre of the harbour to the anchorage. In summer, when the sea breezes are generally light, sudden squalls come off the hills, and, if intending to remain many days, it is best to moor; but in winter violent land winds seldom blow. Many mooring buoys have been laid down for the use of Italian men-of-war; these considerably increase the capacity of the harbour for the accommodation of shipping.

Prohibited anchorage.—In order to avoid damage to the submarine telegraph cable eastward of the entrance to Massawa harbour, vessels are prohibited from anchoring in that locality southward of a line drawn East from Ras Mudir light-buoy. Two beacons show the line of telegraph cable.

Massawa was ceded to Italy by Egypt in 1885; the town stands on the outer small coral island forming the southern side of the harbour, and was formerly a most wretched and dirty place, partly built of coral and partly of mud, and only occupying the inner part of the island. Since its occupation by the Italians it has greatly improved, many new houses having been built, and many others are still in progress. The causeway connecting the town with Taoualoud island is about 450 yards long. Commencing from the causeway, a stone quay has been constructed along the North front of the town, and farther eastward a wooden pier, with water pipe, is carried out to the edge of the reef.

Taoualoud island is connected with the mainland by a causeway 7 cables long, fortified at the island end, and there are hut barracks erected for the troops on this island.

A line of railway for military purposes has been constructed inland as far as Sahati, a distance of about 17 miles; it passes through Hotumlu, Makullu, and Dongali, and all the stations on the line are strongly fortified. The Massawa terminus is on the northern side of the harbour, on the peninsula of Abd-el-Kadir, now nearly covered with the storehouses of the Naval Arsenal. On the south-western shore of this peninsula are piers and boat slips.

The island of Jerrar, the inner of the two northern islands forming the port, is occupied by military storehouses and barracks, and its western end is fortified. Two wooden piers have been carried out from this island to the edge of the reef in the North-west arm; and three stone jetties with steps, a wooden water-pipe pier, and a coal jetty have been constructed on the southern side of the island towards the main harbour; the depth at the heads of these piers is not accurately known.

From Seraglio island a wooden water-pipe pier projects to the edges of the deep water on its north-western side, and on its north-eastern side is a substantial stone pier intended to be carried out to deep water, and now in course of enlargement.

The most conspicuous buildings at Massawa are the palace of the Comando, a domed house with pillars on Seraglio island at the head of the harbour, and the mosques, whose two minarets can be seen 10 miles distant; the Custom-house is a tall white house close to the latter. There was a garrison of about 3,000 men at Massawa and in the neighbouring villages in 1886, but no estimate is given of the present civil population.

A British vice-consul is stationed at Massawa.

Telegraph.—Massawa is connected with Asab and Perim by submarine cable, which leaves the shore of Massawa island about a cable southward of Ras Mudir and trends in an E.N.E. direction until in deep water.

Coal and supplies.—About 3,000 to 4,000 tons of coal is generally in store at Massawa; 200 tons can be supplied by lighters in a day. Other supplies are scarce. Beef is generally to be had, and is the best meat obtainable. Goat mutton, fowls, and fish are also to be procured, but are bad of their kind. Vegetables are plentiful.

Water is brought into a large reservoir on the island of Taoualoud by pipes from the village of Makullu, 4 miles distant, where it is pumped up from a well giving a constant supply, but the water is not of good quality. There is also a large reservoir with taps all round in the western part of the town. Two condensers have also been erected, one at the naval arsenal, the other at the town; each can produce about 10 tons of water per diem. Water may be obtained through contractor at 10s. per ton.

See plan, No. 460.

Trade and communication.—The exports now are ivory, gum, hides in considerable quantities, and a little gold, brought by caravans from the interior; the imports are, wheat and piece goods, British and Indian. Though the troubles in the Sudan and military operations between the Italians and Abyssinians have interfered with trade, there can be no doubt that this port will eventually become of considerable mercantile importance. There is weekly communication with Naples, and weekly communication with Aden, connecting there with the Indian mail; all by Florio-Rubattino steamer. A small English steamer also trades between Aden and Massawa.

Climate.—The climate of Massawa is intensely hot, but, on the whole, not unhealthy. Land and sea breezes appear to prevail all the year round, the latter from the north-eastward and double the strength of the former. The temperature is very much the same as that of Sawákin, and certainly not cooler. About 4 inches appears to be the total ordinary rainfall for the months of December, January, and February. Reliable statistics on these subjects are, however, very much required. See Appendix, page 480.

Tides.—It is high water, full and change, at Massawa at 1 h.; springs rise 4 feet; neaps, 3 feet.

Jezirat Sheikh-Said or Turtle island is a small sand and mangrove island one mile southward of Massawa, surrounded by a wide reef and connected with Massawa island by a shoal bar over which 2 fathoms is the least water in mid-channel. Between it and Taoualoud is a creek one mile long with depths of from 10 fathoms in the entrance to $3\frac{1}{4}$ fathoms close up to the causeway connecting Taoualoud with Massawa.

Harkiko bay.—Southward of the Massawa islands, the coast line sweeps round in a bold bay 6 miles across from Massawa island to the land near Ras Guddam south-eastward of it. Southward of the reefs off the Massawa islands, Harkiko bay is all deep to within half a mile of the shore, except that off the village of Harkiko, at 6 cables from the shore, is a small coral shoal with a least depth of 19 feet; from it, the minaret of Harkiko bears N.W. by W. $\frac{1}{2}$ W. 9 cables. There is a passage 200 yards wide, with 6 and 7 fathoms water, between it and the shore. There are many shoal patches with depths of one and 2 fathoms in the north-west bight of Harkiko bay.

The shore line is low, and the plain rises gently to the foot of the low coast ranges $2\frac{1}{2}$ miles inland from Harkiko.

Harkiko is a large village standing on the shore about the middle of the bay, to which it gives its name. A minaret and several houses show

See plan, No. 460.

up white from a distance. A jetty starting from near the large white house at Harkiko runs out 440 yards.

Jebel Guddam, on the south-eastern side of Harkiko bay and on the western side of Annesley bay, is an isolated mountain mass, rising 3,035 feet above the sea, and is wooded to the summit. It is a magnificent landmark, and, in clear weather, may be seen from a position northward of Harat island. In shape, it is irregular and rounded, with several little peaks of nearly the same altitude, none being markedly superior to others. The true summit is a small pyramidal peak, about 12 miles S.S.E. from Massawa, conspicuous from the North by its shape, and situated about a third of the breadth of the top of the mountain from its eastern side.

Jebel Guddam and the plains around it abound with game. Ostriches, wild boar, guinea fowl, spur fowl, antelope, gazelle, and hares are all to be found at about a mile from the sea shore. The plain is dotted with small villages, and affords pasture for many cattle and sheep.

Ras Guddam.—Shoal.—Ras Guddam is a low rounded coral point, the south-eastern extreme of Harkiko bay. A shoal lies $1\frac{1}{4}$ miles E. by N. $\frac{1}{4}$ N. from a conspicuous tree on the coast about three-quarters of a mile south-eastward of Ras Guddam, and only just within the 20-fathoms contour-line; it is marked by discoloured water, and has a least depth of $2\frac{3}{4}$ fathoms, with the northern extreme of Ras Guddam bearing W. by N. $\frac{1}{4}$ N.

ANNESLEY BAY is the deep bight included between the high land of Hartau on the East and the land of Guddam on the West. It is a fine inlet extending N. by W. and S. by E. 26 miles; its greatest breadth is 12 miles, and its least, abreast of Malkatto, is 4 miles. From the shores of this bay in the days of the Ptolemies, the Greeks carried on a thriving trade with Axum, by way of Degonta; while, in recent times, the Portuguese and other modern travellers have taken the route by Massawa. The ancient Greek city Adulis, the emporium of their trade, was then close to the shore; its ruins are now 4 miles inland on the left bank of the Hadas. The modern village of Zula is at a little distance from the shore on the right bank of that river.

Aspect of the Land.—When seen from the Massawa channel, Quoin hill, 249 feet high, on the eastern side of Annesley bay in line with Disei island, shows as a sloping piece of land of the quoin or wedge shape, the bluff being to the north-west. Jebel Dulhe, elevated 764 feet, the high land of Hartau, is very conspicuous. On the western side of the bay is Jebel Guddam and other high land sloping gently towards the sea.

Soundings.—There are 44 fathoms, mud, in the western entrance of Annesley bay, decreasing gradually to 25 and 18 fathoms, mud, in the

See chart, No. 164.

southern part; and, from 16 to 12 fathoms are found pretty close to the shore, except on the western side, about 5 miles southward of Ras Guddam, where, and in that vicinity, the shore bank extends off from 5 cables to a mile, with as little as 6 feet at its edge; and again, between Malkatto and Arafale, where a shoal of $2\frac{3}{4}$ fathoms projects 7 cables from the beach. At a short distance from Disei island, passing to the northward along its eastern side, as well as that of the reef and Madote island adjacent, the depths are from 24 to 30 fathoms, quickly increasing to 40 and 45 fathoms after passing the latter.

Malkatto, the place of debarkation for troops during the Abyssinian expedition of 1868, is a few yards southward of the place where the dry bed of the river Hadas reaches the sea in lat. $15^{\circ} 16' N.$, and the ships were moored a quarter of a mile from the shore. The land is low and shelving near the beach in the vicinity of the river bed, and at high water a considerable portion covers with the tide. The site of the encampment is called Malkatto from a well of that name about a mile inland. Malkatto is an Italian post marked by a flagstaff.

When the sky is clear, there is a magnificent view of the Abyssinian Alps from the anchorage, the passes cleaving them literally from north to south, so that the ridges appear to rise one above the other in a succession of waves; the plain around Malkatto also looks green, but on landing, all illusion as to its nature caused by its green appearance is at once dissipated. A sandy plain, overlying clay, intersected by dry beds of torrents and overgrown with such plants as salicornia, acacia, and calotropis, extends from the sea-shore to the mountains; there are also tufts of coarse grass in patches on this plain.

The Shohos, who inhabit the plain, are a black race with rather woolly hair, small boned, but with regular, and in some instances even handsome features. They cultivate a little jowari, and have cattle of a very small breed, besides asses, goats and sheep; their huts are scattered over the plain. Round Malkatto, and in the vicinity of Dolphin cove at the head of the bay, game abounds, and especially so during the rainy season, which commences in December; antelopes, gazelles, hares, bustards, and spur fowl are plentiful. On the eastern side of the bay wild pigs, which feed on the sea-shore, may be found.

The rain-fall is very small.

Arafale.—At the head of Annesley bay, on the south-western side, is the village of Arafale, consisting of a collection of mud huts at the mouth of a valley, close to the shore. This is now an Italian fortified post, with a garrison of about 150 men; it is about S. $\frac{1}{2}$ E. 10 miles from the Malkatto anchorage, and has three conspicuous extinct craters a mile or two southward and south-eastward of it. The anchorage off Arafale is

See chart, No. 164.

quite open ; a coral reef extends about $1\frac{1}{2}$ cables from the shore, and at the distance of 7 cables there is a shoal of $2\frac{1}{4}$ fathoms.

Water may be procured at Arafale by digging, and there are several wells. At Alifat, about 5 miles to the north-west, there are hot salt springs.

Dolphin cove.*—On the south-eastern side, at the head of the bay, is this little anchorage formed by a cove in the shore fringing reef ; it is about $2\frac{1}{2}$ cables wide and the same depth, with from 7 to 4 fathoms water, sand and mud, good holding ground. The shore of the cove is flat and low, but at about 700 yards inland rises suddenly to a rocky ridge 492 feet in height, fronting Jebel Abdur, of 804 feet, standing about $1\frac{1}{4}$ miles inland. South-eastward of the cove are ridges of old black lava fields, thickly covered with brushwood. Northward of the cove, the country is more sandy and open. Game abounds here and plenty of fish may be caught with the seine at the head of the cove.

Beacon.—A stone beacon, coloured white, plainly visible from seaward, has been erected on a mound 38 feet above the sea, at $3\frac{5}{6}$ cables E. $\frac{1}{4}$ N. from North-west rock.

Water.—Several wells of good water are to be found in the wadies about three-quarters of a mile from the beach, E.S.E. from the cove.

Melita bay,* $6\frac{1}{2}$ miles northward of Dolphin cove and one mile eastward of Ras Nasiracurra, affords anchorage with shelter from all winds but those from the south-west quarter. The bay proper, bordered by a grassy plain about 20 feet above the sea, is about 2 miles long north and south, and $1\frac{1}{4}$ miles across, but a broad fringing coral reef with only one to 2 fathoms water over it, fills up the greater part of the bay. Anchorage may be taken in $6\frac{1}{2}$ to 8 fathoms, sand and stones, with Quoin hill in line with a conspicuous V-shaped mangrove N.N.W. $\frac{1}{4}$ W., and with a beacon, 10 feet high, standing on the coastline bearing N.N.E. $\frac{1}{2}$ E. There is softer bottom, in a depth of 6 fathoms, about 3 cables W. by S. $\frac{1}{4}$ S. of the above position.

A $3\frac{3}{4}$ -fathoms patch lies about 9 cables S.E. by E. $\frac{1}{4}$ E. from Cliff point and in the approach to this anchorage.

The shore from Ras Nasiracurra to the westward, for about one mile, has patches of 2 and $3\frac{1}{4}$ fathoms off it at the distance of 3 cables.

Ras Hartau, forming the north-western point of the Hartau peninsula, is situated $5\frac{3}{4}$ miles northward of Quoin hill ; it is 138 feet in height, and is marked by a white masonry building.

Madote islet is a low sand island 8 feet high, bearing E. by S. 16 miles from the entrance to Massawa, and 9 miles W.N.W. from Assarka.

* See plan, No. 1,109.

It stands near the end of the long reef, extending N. by E. 5 miles from Disei island, and which projects half a mile beyond Madote.

Anchorage.—There is anchorage on the north-western side of the island in from 10 to 15 fathoms, sand, with the centre of Madote on with Dulhe peak S.S.E. $\frac{7}{8}$ E.; but the ledge is very narrow and must be approached with caution. It falls quickly into deep water.

Mujunia reef, 3 miles N.W. by W. of Madote, and E. $\frac{1}{2}$ S. 13 miles from Massawa entrance, is a 3-fathoms bank with a small one-fathom reef on it. A can buoy, painted black, and surmounted by staff and cage, is moored on the north end of Mujunia reef. There is anchorage one mile N.N.E. of the shoal part, which is generally to be seen.

Abdulla-Aba-Madda bank, of coral, with a least depth of 7 fathoms, lies in the north-western fairway to the Narrows, N.N.E. $\frac{1}{2}$ E. 4 miles from Madote islet; the bank of oval form, is one mile in length in a N.N.W. and S.S.E. direction.

DISEI ISLAND, lying in the entrance of Annesley bay, is one of the pleasantest spots in the Red sea. It is a volcanic island, 4 miles in length north and south, having a succession of conical peaks, the highest of which, above Village bay and $2\frac{1}{2}$ miles from the northern end, is 341 feet high. The island lies about 3 miles westward of the northern end of the Hartau peninsula; a reef projects eastward upwards of 5 cables, from the inner side of its south point. Its picturesque shape, the verdure of its valleys, and the vegetation on its hills, are a relief to the eye, especially as seen from the anchorage of Village bay.

Village Bay anchorage is a small bay on the eastern side of the island just northward of the highest peak. There is good anchorage here in 7 fathoms, with the northern point of the bay N.W. by W. $\frac{1}{2}$ W. $1\frac{2}{3}$ cables, and the peak S.W. $\frac{1}{2}$ S. A small shoal, with a rock awash at half tide, lies on the southern side of the anchorage 2 cables from the shore eastward of the peak.

Care is required in entering this anchorage, as the water shoals very suddenly. There are 17 fathoms only half a mile from the shore.

The village is small and there is plenty of live stock, but the inhabitants do not seem anxious to sell.

Water.—There are some wells of good water near Village bay, but they are not convenient for watering a vessel.

Disei channel, between Hartau peninsula and Disei, is deep and wide. The volcanic islet Sheel, 80 feet high, upon which there is a white masonry beacon, lies in mid-channel eastward of the peak; it may be passed on either side. Off the southern end of Disei are West rocks and

See chart, No. 164, and plan of Disei anchorage, on chart, No. 8d.

East rocks, white in colour, 15 feet high, bearing E.S.E. and W.N.W. from each other, and half a mile apart; the outer (East) rocks bear S.E. by S. one mile from the southern point of Disei; there are 10 fathoms water between the two patches of rocks. Between West rocks and the south end of Disei there is a patch of $1\frac{3}{4}$ fathoms.

Indore rocks, about 100 yards in extent, are distant 3 cables E. $\frac{1}{2}$ S. from East rocks, and are coral heads with 6 feet water on them. The Hartau side of the channel here is steep and bold, and must be hugged by a passing ship to avoid the Indore rocks. After passing them, the shore between Ras Hartau 138 feet high, upon which there is a white masonry beacon, and Quoin hill is skirted by a reef and must be given a berth.

Hotha island is $5\frac{1}{2}$ miles S.S.E. $\frac{3}{4}$ E. from Madote, and is $1\frac{1}{2}$ miles long from north to south, and about 50 feet high, with a flat top. At low water it is connected with Hartau peninsula, 2 miles distant to the southward, by a dry reef.

A reef extends $1\frac{1}{4}$ miles north-eastward of Hotha, and the bay between it and Ras Korali is mostly shoal, with patches of rock.

Tides.—It is high water, full and change, at Disei at 1 h.; the rise at neaps is 3 feet. A branch of tide flows perceptibly southward into Annesley bay.

Assarka islands, two small islands about 20 feet high on the south-western side of the Narrows, lie north-west and south-east from each other with a 10-fathoms channel 3 cables wide between them. They are $1\frac{1}{2}$ miles from Dilemmi island, which may be considered the nearest part of the Hartau peninsula, as at low water that island is connected with the mainland. The northern Assarka island is mostly edged with low cliffs, and has a white masonry beacon on its western extreme; the southern is all sand. A reef awash extends S.E. 4 cables from South Assarka.

Two miles S.E. by E. from the southern Assarka is a 5-fathoms patch, and less than a mile S. by E. from it is a patch of $4\frac{1}{2}$ fathoms. The anchorage off the Assarkas cannot be recommended, but northward of Dilemmi there is a good and convenient anchorage.

Hartau peninsula, a low tongue of land 24 miles long and from 13 to 16 miles wide, projects from the mainland in a N.N.W. direction, its western side forming the eastern boundary of Annesley bay, and the other the southern shore of the South Massawa channel. The northern extreme of the peninsula is Ras Korali; westward of it, the land is deeply intersected by shallow bights and bordered by several islands, of which Hotha, just described, is one.

Dilemmi, another island, jutting out to the north-east, is the southern boundary of the Narrows; it is connected with the mainland at low water and has but very little reef extending from its eastern side, so that it may

be passed within a quarter of a mile. The island, 25 feet above the sea, is wooded and its centre is a spacious grass plain which affords pasture for numerous cattle and sheep. On the western side of the plain are many wells, mostly dry in December. Game abounds both on the island and on the mainland in the vicinity of Ras Korali, where antelope also are found in addition to hares, spur fowl, guinea fowl, and bustard. Fish may be caught by the seine.

Anchorage.—During southerly winds there is good anchorage north-westward of Dilemmi in 13 fathoms, mud, a mile from the shore, or closer to it in $6\frac{1}{2}$ fathoms.

Caution.—As invalids suffering from small-pox and other infectious diseases are sometimes sent to Dilemmi from Massawa, inquiries should be made before landing.

Jebel Dulhe is a range of hills extending north-west and south-east on the Hartau peninsula, the culminating point being a cone 764 feet in height, which preserves its shape in all directions, and is a capital landmark; but it must not be mistaken for Disei island, which has a very similar appearance when seen from the North, though only half the height.

From Dilemmi island southward to Howtha point, the shore of the Hartau peninsula trends S.E. 15 miles, and is all low with but little reef bordering it. There is a 4-fathoms patch at $1\frac{1}{4}$ miles, and a 3-fathoms patch at 2 miles, S.E. from Dilemmi.

Umm Namus, a small island 30 feet high having on it some conspicuous trees, lies $1\frac{1}{4}$ miles from the shore, and 10 miles S.E. from Dilemmi. Its reef runs off 5 cables to seaward, but is narrow on the shore side.

Anchorage.—Sheltered anchorage may be taken up inside Umm Namus in 14 fathoms, according to the direction of the wind. It is best to anchor near the island for protection as well as to avoid some $3\frac{3}{4}$ -fathoms patches of coral off the mainland.

Reef.—There is a one-fathom patch N.W. $\frac{3}{4}$ W. 2 miles from Umm Namus, which must be avoided when approaching the anchorage from the northward.

Fawn shoal.—H.M. surveying vessel *Fawn*, passing through the Massawa channel in March 1881, found less water than was previously supposed in a position N.E. $\frac{1}{4}$ N. 4 miles from Howtha point. The *Fawn* anchored on the shoal, which was found to have a least depth of 5 fathoms.*

* In 1889, the master of the s.s. *King Arthur* reported seeing discoloured water in a position approximately and by dead reckoning about 2 miles eastward of the Fawn shoal; it may possibly be identical with it, but ships should keep a good look-out for shoal water when in this vicinity.

See chart, No. 164.

HOWAKIL BAY is a large and deep bight 31 miles in length from Howtha point to Ras Andadda, and which opens 5 miles southward of Umm Namus. It is a maze of islands and reefs, with channels between only imperfectly surveyed; but, under the lee of the outer islands, there are several good anchorages which will be described.

There are numerous mountains and hills at the back of Howakil bay, some in ranges, some isolated volcanic cones and tables. The only one used as a landmark is Barn hill, a small but remarkable table hill, 480 feet high, on the shore of the bay $10\frac{1}{2}$ miles S.W. $\frac{1}{2}$ S. from Howakil peak. In very clear weather, the magnificent heights of Abyssinia may be seen rising range after range to the height of 10,000 feet.

Howakil island is nearly in the centre of the bay of that name, its sharp volcanic summit rising to a height of 720 feet. It is of an irregular shape, 6 miles long north-east and south-west and 3 miles wide, the seaward portion being low and of coral. Off its north-eastern point is the small island Laksu, 20 feet high, connected with it by a reef which can be crossed in a boat only. There are a few mat huts and some scanty wells of water in a bay facing S.E. The inhabitants are wretchedly poor people.

Adjuz appears to the eye a perfectly level island of coral, 30 feet high and sprinkled with bushes. It is about $2\frac{1}{2}$ miles in diameter and lies $1\frac{1}{2}$ miles northward of Howakil, with a navigable channel between them. There is but little reef off Adjuz, and what there is can always be seen. There are a few miserable huts and some wells.

Tahara islet is a sand-bank always dry and in mid-channel southward of the south-western point of Adjuz. There is a $4\frac{1}{2}$ -fathoms channel between it and Adjuz, but the bank extends eastward in mid-channel between Adjuz and Howakil, and on it are the following dangerous shoals:—

Shoals.—In the entrance between Howakil and Adjuz is a shoal extending 5 cables E.N.E. and W.S.W., $2\frac{1}{4}$ cables wide, with as little as 5 feet water; from it, the south-eastern extreme of Adjuz bears N. by E., and the northern extreme of Laksu islet E. $\frac{1}{4}$ N. Between this shoal and the south-eastern shore of Adjuz there is a clear channel $4\frac{1}{4}$ cables wide.

In line between the shoal just described and Tahara islet is another shoal of 16 feet about 2 cables in extent; from it, the south-east extreme of Adjuz bears N.E., and its south-western extreme N.W. by W. $\frac{1}{2}$ W. Close to the southern shore of Adjuz there is a shoal about a cable in extent with only 8 feet water.

Outside and eastward of these islands are several 10-fathoms patches.

Anchorage.—There is excellent anchorage on all sides of Adjuz in from 9 to 5 fathoms, sand and mud.

In a south-easterly breeze, smoother water will be found inside the island with the South-west point, a sandy spit, bearing E.S.E., and the West point N. by E. A depth of 5 fathoms, sand, will be found here, and there is no danger in the channel from the northward if a ship does not get westward of the line of the West point of Adjuz on with Howakil peak S. by E. $\frac{1}{2}$ E., until the Dableid bank, a one-fathom patch $1\frac{1}{4}$ miles W.N.W. from Adjuz, which generally shows, is seen on the starboard bow.

In a northerly wind, the channel between Adjuz and Howakil affords the best anchorage, avoiding the shoals just described lying along its centre. Anywhere on the Adjuz side are good berths in 6 fathoms. The Howakil side has also several patches, and, in entering, Laksu island must not be brought eastward of E. $\frac{1}{2}$ S. until assured of being northward of the 5-feet reef in the entrance.

Temporary anchorage can also be obtained westward of the next island, 4 miles north-west of Adjuz, at 7 or 8 cables from the shore in 10 fathoms, sand, with Howakil peak seen over the centre of the island bearing S.E. by S. Between this island and the point southward of Umm Namus, in fine weather, the anchor can be dropped anywhere on the same bearing in from 10 to 14 fathoms.

Between Howakil and the islands of Delgummun south-eastward of it, there is a crescent-shaped bay, 3 miles across, but it is nearly filled with reef, and no protection is obtainable in strong winds. The best anchorage is in 7 or 8 fathoms, sand and shells, under the north-eastern point of Howakil, with its peak bearing S.W. by W. $\frac{1}{4}$ W., and with the whole of Laksu island well open of the north-eastern extreme of Howakil.

Jebel Baka is the largest island in Howakil bay, but standing farther back and being a flat-topped table land 520 feet high, it is not so conspicuous as the peaked and higher Howakil. Its northern point is $3\frac{1}{2}$ miles S. by W. from Delgummun. From this northern point, a reef with an island 20 feet high, and $1\frac{1}{2}$ miles in length on it, extends nearly 5 miles in a north-easterly direction; this reef forms the southern side of a channel leading into the inner part of Howakil bay, passing southward of Howakil and Delgummun. To enter this channel bring Barn hill to bear S.W. by W. $\frac{1}{2}$ W. and steer for it.

Anchorage.—There is good anchorage everywhere in the channel just described, and well protected as soon as the island north-eastward of Jebel Baka is passed. A good berth is in 6 fathoms, sand and mud, off the latter island, with its western point bearing S.S.E., and the northern point of Jebel Baka about S.S.W. $\frac{1}{4}$ W.

Umm-es-Sahrig is a coral island in the south-eastern part of Howakil bay; it is 20 feet high and $1\frac{1}{4}$ miles in diameter, and its north-eastern extreme bears S.E. by E. $10\frac{1}{4}$ miles from the north-eastern point

of the Delgummun islands, and N. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles from Ras Andadda. The island is dotted with low bushes, and there is scarcely any reef on its outer shore.

There is a small 4-fathoms patch East one mile from Umm-es-Sahrig, with from 8 to 10 fathoms water between the patch and the island.

Anchorage.—There is good anchorage in southerly winds northward of Umm-es-Sahrig in 8 fathoms, $1\frac{1}{2}$ miles distant from it. Also, in northerly winds, on its southern side, 7 or 8 cables distant from the shore, but its eastern point should not be brought to bear eastward of N. by E.

Ras Andadda, the south-eastern point of Howakil bay, is a small promontory with two double-peaked hills on it 240 feet high.

Beach hill is another promontory $2\frac{1}{4}$ miles S.E. by E. from Ras Andadda; it is a double-peaked hill similar in shape to those on Ras Andadda, but rather higher, being 330 feet above the sea. It is a capital landmark, and can be plainly distinguished from the deck at a distance of 18 miles, looking like an island, the land from which it rises being very low. There is no reef off these two promontories.

There are other volcanic hills behind Beach hill, but they are not so conspicuous.

From Beach hill, the coast trends generally in a S.E. $\frac{1}{2}$ E. direction for $16\frac{1}{2}$ miles to the entrance of Hanfela bay. There are two coral points on this piece of coast, Ras Gurmud and Ras Maurekh, with deep bays between them entirely filled with reef.

Ras Gurmud, the northernmost of these, is $4\frac{1}{2}$ miles S.E. by E. from Beach hill. It is a coral point 15 feet in height, and makes as an island even when close in shore, it being only connected with the land by a low neck of sand.

Ras Maurekh is a similar point, but presents a longer face to the sea. It is 9 miles S.E. by E. from Beach hill, and is backed by mangrove swamp. There is deep water pretty close to Ras Maurekh, but, off it, are three patches about 2 miles from the shore, with, however, not less than 4 fathoms on them.

Jebel Maurekh consists of three remarkable black cones, $2\frac{1}{4}$ miles inland, and completely isolated. They bear S. by W. 5 miles from Ras Maurekh, and S.E. by S. 13 miles from Beach hill. Two are about 420 feet above the sea; the third is lower. They are seen for a long distance on a clear day. The northern cone is truncated.

Ras Madr, the northern point of Hanfela bay, is of coral and is the point of an island at high water but connected with the mainland by dry sand at low tide. The island is about 2 miles long, presents cliffs of coral about 20 feet high, and is about 30 feet high at its widest part.

Boat harbour.—There is a narrow boat channel through the reef which fills the bay between this island and Ras Maurekh, leading to the northern point of the former, and there is a good boat harbour inside. The southern large cone of Jebel Maurekh on with the northern point of Madr island leads to the mouth of this channel.

Anchorage.—The anchor can be dropped anywhere along this coast in fine weather in from 8 to 14 fathoms from $1\frac{1}{2}$ to 3 miles off-shore.

HANFELA BAY is a large bay 10 miles wide across the entrance between Ras Madr and Ras Hanfela, which bear from each other N.W. $\frac{3}{4}$ N. and S.E. $\frac{3}{4}$ S.; it has many islands and shoals in it. The land at the back is a vast plain dotted with small hills, and bordered on the South, 10 miles distant, by mountains extending westward. The villages of Arassan Madr, and Hanfela, stand on the shores of this bay.

Barm-al-Haji are the two outermost islands in Hanfela bay. The outer one, Benal-l-wa, is $4\frac{1}{4}$ miles E.S.E. from the outer point of Ras Madr, and is a small flat bare coral islet 10 feet in height; the other, Benat-l-wa, is $1\frac{1}{4}$ miles south-westward of the first and has bush on it. The islands are connected by a reef which should not be approached too closely, but which, in case of necessity, has a $3\frac{1}{4}$ -fathoms channel across it, about midway between the islets.

Anchorage.—There is good anchorage in southerly winds westward or north-westward of the outer island, in 9 fathoms, sand and mud.

Daramsas or Hanfela island, in the southern part of the bay, is $1\frac{1}{2}$ miles northward of Ras Hanfela. It is covered with scrub, and 25 feet high. From the spit off the south-western part of the island, a reef extends 4 cables in a south-westerly direction, having on its outer end a rock awash at low water. There is a 7-fathoms channel between the island and the main.

A shoal having a depth of 2 fathoms lies N.W. by W. $1\frac{1}{4}$ miles from the west extreme of Daramsas; and W.S.W. from the spit off this point, separated by a 6-fathoms channel about 3 cables wide, is another shoal with a general depth of 2 fathoms, and a patch of 6 feet at its western end. A 6-fathoms bank of coral and sand lies 5 miles E. by N. from the island.

Anchorage.—There is a good anchorage on the north-western side of Daramsas in 8 fathoms, sand, with the western point of the island bearing South one mile. In entering this anchorage, do not approach the island within half a mile, as the 2-fathoms line is at some distance from it.

The Harbour.—In the interior of the bay are the two islands Anto Kebir and Anto Seghir, more than one mile apart in a North and South direction. Both are surrounded by coral reef and connected with the shore by it near the village of Madr. The reef from the northern end of Anto Seghir, the southern islet, extends nearly halfway across to the northern island, leaving between the reefs of the two islands a narrow

2½-fathoms channel into the harbour, a snug anchorage for small craft, and with a pool north-westward of Anto Seghir, 5 cables long north and south, and 3 cables across, where there is a depth of 3¼ fathoms.

Kutto islet lies 1½ miles south-eastward of Anto Seghir, and between these islands there is anchorage in 6 fathoms, but the ground in the vicinity is very irregular, and there are many shoal patches of from 2¼ to 3½ fathoms hereabouts. On the western side of this islet is a shallow inlet through the reefs, about 3 miles in length in a general S.W. by W. direction, leading into a small bay in the mainland, the entrance points of which are only about 2½ cables apart with Alet islet, upon which there is a small village, lying in mid-channel, at about a mile off the entrance.

Tides.—It is high water, full and change, at Hanfela bay, at 1 h. 21 m.; the rise is 3 to 4 feet; the tidal streams are scarcely perceptible.

Ras Hanfela, the south-eastern point of Hanfela bay, is a coral point 35 feet high, which, when bearing S.S.W. makes as an island; there is no reef off the point. There is anchorage in from 3 to 4 fathoms in a small bay half a mile westward of it.

Coast line.—From Ras Hanfela, the coast trends S.E. by E. ¼ E. 18 miles to Ras Shakhs. Ras Anrata is a low coral point 4 miles S.E. by E. ½ E. from Ras Hanfela, and looks like an island close to the shore. There are several shallow bays on this low sandy piece of coast, but they are not visible from a passing ship, and the shore seems one uniform line; see view on Admiralty chart, No. 143, Jebel Teir to Perim island.

Ras Shakhs, in lat. 14° 37' N., long. 41° 10' E. is low and sandy, and is the point from which the general direction of the coast begins to become more southerly; the point is not conspicuous, as a broad flat plain lies between it and the foot of the mountains. It is a dangerous point during the day in hazy weather, and still more so at night, as it cannot then be seen until close on board. The 5-fathoms line of soundings is at no great distance from the shore eastward of the point, but to the northward is Shab Shakhs.

SHAB SHAKHS is an extension from the shore bank in a north-westerly direction from Ras Shakhs for a distance of 5 miles from the latter and 3 miles from the nearest part of the shore, where there is a one-fathom shoal increasing quickly to 3 and 12 fathoms. This shoal does not show well, and the soundings outside give no indication of its vicinity.

A shoal of 2¼ fathoms, upon which the S.S. *Electra* touched on 19th February 1900, lies 3¼ miles N.N.W. of the extreme point of Shab Shakhs; from the shoal, Ras Shakhs was found to bear S. 31° E., distant 8¼ miles, and 740-foot hill S. 2° W.

Caution.—The bottom is uneven and the 5-fathoms contour-line of soundings varies its distance considerably from Ras Shakhs; caution is therefore requisite when approaching the shore for the purpose of anchoring.

There is a 6-fathoms coral bank 9 miles N. $\frac{3}{4}$ W. from Ras Shakhs.

Inland features.—About 9 miles in the interior from Ras Shakhs, rises a mass of mountains attaining a height of 4,100 feet at 18 miles from the sea. They stretch for many miles southward, but this is the northern limit of the range, which here turns westward and recedes from the coast.

To a vessel approaching from the northward, the mountain that shows most to the left and appears nearly isolated is Jebel Kosar; it is 16 miles S. $\frac{1}{2}$ E. from Ras Shakhs, and is 2,300 feet high.

Jebel Anrata, 17 miles N.W. $\frac{1}{4}$ W. from Jebel Kosar and 1,950 feet high, is also conspicuous from both North to South, showing as a rounded summit on the eastern extreme of a flat ridge which falls abruptly towards the sea.

Some smaller peaks in the plain about 6 miles south-westward of Ras Shakhs, are conspicuous by their jagged shapes, and may often be seen when the higher and more distant mountains are veiled in haze.

The description of the coast from Ras Shakhs southward is continued at page 218.

DAHALAK BANK and ISLANDS.—The islands on this bank lie between the parallels $16^{\circ} 37'$ N. and $15^{\circ} 22'$ N., Difnein being the most northern and Bu-l-hissar the most southern of the group; the shoals extend far beyond these limits. The islands are principally composed of coral fringed by reefs, and have channels of moderate depth between, with many shoal patches in them. For ships intending to reach the western coast in this vicinity, there is no channel across the Dahalak bank southward of Enta-entor island; that is, for a space of nearly 50 miles in a south-easterly direction.

Caution.—The bottom on the Dahalak bank is principally sand and coral, with an occasional patch of mud. From the nature of the bottom there can be no doubt of the existence of many shoal patches not marked on the chart; therefore, great caution is required when navigating in this vicinity, for, although the coral shoals, if large in extent, may sometimes be seen, those of sand cannot be distinguished from the light-coloured water everywhere prevalent on this bank. In most parts of the Red sea, on the contrary, the reefs are steep-to and can easily be distinguished by the difference in the colour of the water, the reefs nearly always showing white.

The northern dangers of 3 fathoms, referred to at page 178 (exclusive of Saunders reef), are Fawn reef in lat. $16^{\circ} 58\frac{1}{2}'$ N., long. $39^{\circ} 34'$ E., and

a similar patch $7\frac{1}{2}$ miles N.E. by N. of that reef, which, however, was not found by H.M.S. *Fawn*. Besides the above, that vessel discovered a bank of 7 fathoms in lat. $17^{\circ} 8' N.$, long. $39^{\circ} 38' E.$; one of 8 fathoms in lat. $17^{\circ} 4\frac{1}{2}' N.$, long. $39^{\circ} 43' E.$; and another of 9 fathoms in lat. $17^{\circ} 3\frac{1}{2}' N.$, long. $39^{\circ} 41' E.$ These banks are each of small extent.

Two-Fathoms bank, 9 miles eastward of Difnein island, is an extensive coral bank with from 2 to 3 fathoms water, which can generally be seen.

Three-Fathoms bank.—At 18 miles E. by N. $\frac{7}{8}$ N. from Difnein is another large coral bank with 3 fathoms on it.

Akbar shoal.—The steam vessel *Akbar* (draught 20 feet) in 1892 reported having touched on a shoal in lat. $16^{\circ} 47' N.$, long. $39^{\circ} 12' E.$ After two most detailed searches by H.M.S. *Stork* (1899) extending over several weeks, as well as other searches made by Italian ships of war, it was decided to omit this rock from the chart, though the ground in the vicinity proves to be very uneven and rocky.

DIFNEIN, the north-western island of the Dahalak group, is in lat. $16^{\circ} 37' N.$, long. $39^{\circ} 18\frac{1}{2}' E.$, at the entrance of the North Massawa channel; it is of coral and sand, a mile in extent, 30 feet high, covered with mangroves, and stands in deep water with but little reef surrounding it. The island is intersected by salt-water creeks. It shows an undulating outline from the North, and the lighthouse, a white wooden building in the form of a truncated pyramid 33 feet high, with a square base, stands on its north-eastern point. There is no convenient anchorage off Difnein, and the nearest part of the mainland is 9 miles distant to the westward.

Current.—In February 1887, whilst stopped off Difnein island, in the channel, H.M.S. *Cygnat* found the current setting W. $\frac{1}{2}$ S. one mile an hour. About the same time, when at anchor on the Two-fathoms bank just now described, the current set W. $\frac{1}{2}$ S. eight-tenths of a mile an hour.

LIGHT.—From the lighthouse on the north-eastern point of Difnein island, is exhibited at an elevation of 62 feet above the sea, a *fixed white* light, which should be visible in clear weather at a distance of 10 miles through an arc of 270° ; viz., from N. by W. $\frac{7}{8}$ W., through east and south, to W. by S. $\frac{7}{8}$ S. This light has been reported to be unreliable, and visible for only 7 miles.

Vessels passing eastward of Difnein should pass it within a distance of 5 miles.

Entesila, 6 miles S. $\frac{1}{2}$ W. from Difnein, is a small coral island, uniform in outline, and covered with dense bush 20 feet above the water

line. There is a reef from one to 2 cables in width around it, and, to the north-westward, a shelving bank on which a vessel might obtain indifferent anchorage in 12 fathoms, coral, with the island bearing S.S.E. 6 cables.

At $4\frac{1}{2}$ miles S. $\frac{1}{2}$ W. from Entesila is a sand and coral bank with 4 fathoms on it.

Abu Rabah is a small coral island of the wedge shape, 35 feet high, with small rocks off its north-eastern and south-western ends; it bears S.E. $\frac{1}{4}$ S. $13\frac{1}{2}$ miles from Difnein, and W. $\frac{1}{4}$ S. 9 miles from Awali Shaura. There are 14 fathoms just northward of Abu Rabah, and more than 80 fathoms a mile to the eastward.

Kad-hu, its western end, 16 miles S.E. $\frac{1}{4}$ E. from Entesila, is a narrow island 2 miles long in an east and west direction, and rather high, with a rocky islet situated $1\frac{1}{4}$ miles off its western end. This island is about 5 miles north of the northern end of a sandy and rocky bank, which, running S.E. $\frac{1}{2}$ S., forms one side of the deep channel on the eastern side of Harat; the bank is about 3 miles wide, and the most dangerous part is towards the southern end, which is lost in the nest of shoals lying between Jerom island and Harat, where there are many spots with as little as 2 fathoms. A bank extending about 3 miles N.N.W. from Kad-hu, has 8 fathoms on its northern end, and 26 fathoms close to it. The northern end of Harat island bears S.W. by S. 12 miles from Kad-hu.

HARAT is an island $7\frac{1}{2}$ miles long N. by W. and S. by E. on the eastern side of the North Massawa channel, with its northern point 22 miles S. by E. $\frac{1}{4}$ E. from Entesila. It is 30 feet in height, has a few stunted bushes, and presents an uniformly flat outline, except at the northern point where there is a slight rise to 35 feet, upon which there is a beacon surmounted by a ball, and also an iron structure. Its southern end takes a decided turn to the westward, the reef from its extreme, on which is the islet Sheikh ul Abu presently described, extending 2 miles farther off into the Massawa channel; there is anchorage both northward and southward of this reef. There are a few huts and wells on the western shore of the island, affording a scanty supply of brackish water in the dry season.

Shab Harat, a narrow reef, extends from the northern end of Harat island nearly 9 miles in a N. by W. direction. Dangerous coral patches are found all over this reef, which is generally visible; its western edge is steep. About 5 miles still farther northward are small banks with 5 and 6 fathoms water on them.

Another detached bank of 7 fathoms lies 2 miles W. by N. from the northern end of Shab Harat. This being principally sand and surrounded by deep water, shows distinctly.

Seil Badira, 15 feet high, is a small coral islet on Shab Harat, $1\frac{3}{4}$ miles N. $\frac{1}{4}$ E. from the northern point of Harat. There are three smaller islets nearer the Harat shore.

SHEIKH UL ABU is the low sandy island on the reef projecting into the channel from the southern end of Harat, itself a sandy horn pointing westward. The reef extends only $1\frac{1}{2}$ cables south-westward of Sheikh ul Abu, but a mass of reefs projects $1\frac{1}{4}$ miles from it in a north-west direction.

LIGHT.—From a post on the north-west point of Sheikh ul Abu island, at an elevation of 46 feet above the sea, is exhibited a *fixed white* light, visible in clear weather from a distance of 10 miles.

Anchorage.—There is anchorage in 12 fathoms, with protection from southerly and easterly winds, $2\frac{1}{4}$ miles northward of Sheikh ul Abu, with Seil Badira on with the left extreme of Harat bearing N. $\frac{1}{2}$ E. Also southward of Sheikh ul Abu, in 13 fathoms, sand and mud, with the right extreme of Harat N.E. $\frac{1}{2}$ E., and the left extreme of Sheikh ul Abu N.N.W. The bank on which is the last-named anchorage, extends from Sheikh ul Abu in a S.S.E. direction for 10 miles, with depths varying from 11 to 20 fathoms, sand and mud, but there is a 4-fathoms patch on it $1\frac{1}{4}$ miles S.E. $\frac{1}{2}$ E. from Sheikh ul Abu light.

Eastward of this bank, and of Harat, is the deep channel before alluded to, which separates them from the adjoining islands.

Dohul Bahut is $7\frac{1}{2}$ miles S.E. from Sheikh ul Abu, and 10 miles N.E. by N. from Ras Harb. It is a small sand and coral island surmounted by a conspicuous clump of trees 35 feet in height. A reef extends from it to the northward for half a mile, but on the southern side it is very narrow. There is anchorage all round in from 7 to 17 fathoms, the shoaler water being at $1\frac{1}{2}$ miles from its north-eastern side.

Dahret.—At $3\frac{1}{2}$ miles S.E. $\frac{1}{2}$ S. from Dohul Bahut, and on the same bank of soundings, is Dahret, a small low sandy islet.

Dohul.—East 2 miles from Dahret is the western point of Dohul, a large low flat island, 3 miles long east and west, 2 miles wide, and about 20 feet high. It is connected with Dahret by a 3-fathoms ridge. There is a village, with a square white mosque, on the northern shore, and half a mile eastward of it is a grove of dom palms, visible 10 miles. Dohul is very steep-to on its southern shore outside the coast reef which extends from 3 to 5 cables.

Baradu.—Four miles eastward from Dohul Bahut, and 3 miles N.E. by N. from Dahret, is Baradu, a sandy island, 20 feet high, $1\frac{1}{2}$ miles long, and with three palms near its centre. A reef borders the western side of Baradu, extending $1\frac{1}{2}$ miles in that direction; it is also joined to Dohul by an extensive reef on which are from 3 fathoms to 3 feet. See page 211.

Dhu Rakaham, in lat. $15^{\circ} 47' N.$, long. $39^{\circ} 44' E.$, is a small coral and sand island on the northern side of the Massawa channel; it is 25 feet high, wooded in the northern part, and bears S.E. $\frac{1}{2}$ E. $12\frac{1}{4}$ miles from Dahret, and N.E. by E. $\frac{1}{2}$ E. 18 miles from the entrance to Massawa. It is fringed by a reef, which falls suddenly into deep water; so that there is no anchorage except on the northern and eastern sides, where a narrow ledge of coral will be found extending 2 or 3 cables from the reef. The extremes of the island bearing N.W. and N.N.E., mark the best berth on the south-eastern side. Between Dohul island and Dhu Rakaham all is deep water.

Dar Ghulla is a similar island 2 miles E. by S. $\frac{1}{2}$ S. from Dhu Rakaham. There is a 7-fathoms patch off the southern end of this island, but the bottom is very foul. A reef with only 2 fathoms bears E.S.E. $1\frac{1}{2}$ miles from Dar Ghulla.

DAHALAK ISLAND is about 80 miles in circumference, and of extraordinary shape; its southern side from Seil Bayus to Ras Shoke its south-eastern extreme, is 27 miles long, and its greatest breadth is $15\frac{1}{2}$ miles. It is principally composed of coral rock, interspersed with spots affording in the rainy season a supply of good grass. The only beasts seen on the island are asses, goats, sheep, and antelopes; the latter are numerous. There are eight towns or villages, viz., Dhu Bellu, Derbushat, Salat, Dahalak Kebir (at the south-western part of the island), Kubbani, Kunbeiba, Gembeli (the residence of the principal sheikh of the island), and Memla. Dhu Bellu, on the eastern side, has the principal trade and best appearance of any of the villages; most of the houses are built of coral and thatched, others are built of loose stones, the outer walls, 10 feet high with sloping grass tops, the plastered houses having square tops; there are also some huts made of coarse grass. For anchorage of Dhu Bellu, see page 214.

The trade of Dhu Bellu is principally with Loheiya and Gizan; from thence they import jowari and dates, and give in return the produce of the pearl banks, such as fish, sharks' fins, the horny part of shell fish, turtle, and pearls. The supply of water is kept in tanks, which are filled during the rainy season; there are also a number of wells about 2 miles westward of Dahalak Kebir, near the beach, surrounded by an embankment forming an irregular figure, about 200 feet across in the broadest part. During the rains there are also a number of fresh-water pools on

the island. There are four mosques at Dahalak Kebir, of which two have domes, and also two burial grounds.

The land of Dahalak is generally low, but with a few very small hills on it, as follows:—Jebel Kusum, a coral mound on the north-eastern part of the island; Bluff, a conspicuous mound of wedge-shape, as seen from the anchorage in Ghubbet Soghra, lies eastward of Nakhra Khor island; and, Imamak, a small piece of table-land 3 miles northward of Nakhra Khor.

GHUBBET SOGHRA is a large inlet about 6 miles deep on the western side of Dahalak, and facing the Massawa channel; the southern and only navigable entrance for shipping is about $6\frac{1}{2}$ miles N.W. by N. of Dahalak Kebir. The passage is about one cable in width, with 6 to 8 fathoms in it, increasing very quickly both within and without to deep water.

Anchorage.—A vessel should anchor in about 6 to 8 fathoms, about 8 cables N.N.W. $\frac{1}{2}$ W. from Cockloft island, near the inner part of the passage; this islet, described on the following page, lies on the south-western edge of a shoal extending from the northern shore. There is anchorage also in Khor Soguri, about $1\frac{1}{4}$ miles inside the entrance on the west side of the Ghubbet, in 10 fathoms; and, at about $3\frac{1}{2}$ miles farther to the southward in a long narrow khor in a depth of 9 to 11 fathoms, sand. The general depth in Ghubbet Soghra is from 70 to 90 fathoms, though there is mostly anchorage all round the ghubbet within the distance of a few cables from the shore.

Water.—The westernmost of the khors, or deep bights, is the most convenient for boats procuring water, which has to be brought in mussucks, and the ship should anchor as near as circumstances admit to expedite the watering.

Tides.—The tide runs rapidly in the entrance to Ghubbet Soghra, and a sailing ship with its assistance may get in or out with but little difficulty; otherwise, with a fair wind only, for there is no room to work through. The rise and fall of the tide in this khor at springs is 9 feet, and the time of high water, full and change, is 1 h. 51 m.

Nakhra Khor island.—The northern side of the entrance to Ghubbet Soghra is the southern side of Nakhra Khor, which island is nearly 6 miles in circumference and of middling height, composed principally of coral rock, but interspersed with small valleys and low spots of good grass, and a few dom trees on different parts of the island; there is also a village near the south shore, the houses of which are built of coral without cement, and with grass tops. On the northern side of Nakhra Khor is another narrow and intricate entrance to Ghubbet Soghra only fit for boats.

Water of good quality can be obtained on the eastern side of the island, about half a mile from the beach, over a rugged road; it is therefore necessary to carry it to the boats in mussucks. Although there is always sufficient for the inhabitants, a ship could not be certain of obtaining water here in the dry season. Goats can be procured.

Cockloft island.—There are three or four small islands on the north-west, and one within the Ghubbet on the eastern side of Nakhra Khor; this latter is Cockloft island which is connected by shoal water with the northern shore. From Cockloft island shoal water projects half a mile southward into the Ghubbet, with 70 fathoms at 5 cables eastward of its extremity.

Entedebir is a coral island about 100 feet in height standing on the bank which extends westward from Dahalak island, from which it is however divided by a channel 3 cables wide.

A lower coral island, 25 feet high, Ente-rahiya, lies a cable southward of Entedebir on the same bank, and Kundabilu, 30 feet high, is a small wooded islet one mile W.N.W. of Entedebir. The bank is steep on its southern edge, but affords an indifferent anchorage ground in 10 fathoms, with Kundabilu bearing N.E. by N. and the right extreme of Ente-rahiya S.E. by E.

Shab Raia.—Westward of Kundabilu and extending $2\frac{1}{4}$ miles from the island is a reef nearly awash, on the extreme southern edge of the bank. A 9-fathoms patch lies $1\frac{1}{4}$ miles westward of this reef. There is a 7-fathoms channel between Shab Raia and Kundabilu.

Anchorage.—Westward and north-westward of the bank, and to within $1\frac{1}{2}$ miles of Dar Ghulla, described at page 202, where the water deepens, there is anchorage in from 10 to 16 fathoms, sand. There is no anchorage in the bay northward of Kundabilu islet, but in the next bay on the north-western side of the Dahalak island, Ghubbet Entatu, there is anchorage off the village of Kunbeiba; in the southern part of this bay is the village of Darsugar, with Gembeli, the residence of the principal sheikh, close at hand. Another anchorage is off Kubbani village, in 6 or 7 fathoms, on the northern shore.

Water of good quality can be obtained both at Kunbeiba and at Kubbani.

Ente-ara.—Proceeding southward from the entrance to Ghubbet Soghra, the first island met with, 4 miles from the entrance, is Ente-ara, a small sandy islet 6 feet high, lying off the Dahalak shore, and E. by N. $\frac{3}{4}$ N. 8 miles from Madote. Though low, its beach shows very white in the sun. There is a channel half a mile wide between its encircling reef and Seil Bayus reef, where a vessel may anchor; but the reefs on both sides must be approached with caution.

Seil Bayus is a small, low, black, rocky islet close to Dahalak island, bearing E.S.E. $3\frac{1}{2}$ miles from Ente-ara, and the reef skirting the Dahalak shore here projects westward 2 miles, turning in again sharply on the southern side of the islet to the shore. There are 45 fathoms, mud, close to the shore, and to the projecting part of the reef off Seil Bayus; but the soundings are very irregular, decreasing from 60 and 70 fathoms at $1\frac{1}{2}$ miles from the bank to 15 and 4 fathoms, rock, and to 2 fathoms a little farther on the reef.

Dahalak Kebir.—Reefs.—There is temporary anchorage off the town of Dahalak Kebir, not however to be recommended. The shore in front of the town is skirted by a reef extending from thence eastward along the southern shore of Dahalak, and close to it the water is very deep. With a southerly wind it is a lee shore, and the bottom is hard rock except near the beach in shoal water. There are several small islands on the reef off this place.

Dahalak Kebir is a small collection of huts with the domed tombs of two sheikhs westward of them, and some good wells, with two or three dom palms.

The Narrows of the Massawa channel are formed between the Hartau peninsula and the island of Dahalak, and are obstructed by the islands of Shumma and the Assarkas. There is deep water throughout and the shore reefs on all sides are steep and easily seen. The shores on either side are low but well defined, being coral walls 5 or 6 feet in height.

Between the Hartau peninsula and Assarka islands the channel is $1\frac{1}{2}$ miles wide with 14 fathoms, but the following shoal heads lie in or near the southern approach:—The $4\frac{1}{2}$ -fathoms patch S. by E. less than a mile from South Assarka; a 4-fathoms patch $1\frac{1}{4}$ miles S.E. from Dilemmi; and a 3-fathoms patch at the distance of 2 miles in the same direction, which bears $1\frac{1}{4}$ miles S. $\frac{3}{4}$ W. from the $4\frac{1}{2}$ -fathoms head previously mentioned.

The main channel of the Narrows between Shumma and Assarka is $2\frac{1}{2}$ miles wide with from 30 to 40 fathoms water, but with a 5-fathoms patch abreast of Shumma at 2 miles S.E. by E. from the southern Assarka. North-eastward of that island is a passage of the same width, with an average depth of over 60 fathoms. At the Narrows, the North Massawa channel ends and the South Massawa channel commences.

SHUMMA is a wooded island about 50 feet in height, $2\frac{1}{2}$ miles long by one wide, lying nearly in the centre of the narrows. It is surrounded by a fringing reef extending about half a cable round its extremes, from 2 to 3 cables on its north-east side, and with varying width, but to as much as 5 cables on the south-western side: it is everywhere steep-to, falling into deep water. No anchorage can be obtained anywhere round the island except in port Smyth.

LIGHT.—From an iron lighthouse on the south end of Shumma island, at an elevation of 59 feet above the sea, is exhibited a *fixed white* light, visible in clear weather at a distance of 10 miles, through an arc of 210° ; viz., from W. by N. $\frac{3}{4}$ N., through north and east to S.E. $\frac{3}{4}$ S. This light has been reported to be irregular. The keeper's dwelling house is close to the lighthouse.

Port Smyth is in the centre of the south-western side of Shumma, where a break in the edge of the reef affords an entrance to a snug lagoon harbour about 6 cables long by $2\frac{1}{2}$ cables wide, with a general depth of 3 to $4\frac{1}{4}$ fathoms, and a small pool with $5\frac{1}{2}$ fathoms, sand and weed, good holding ground. The entrance, between a point of reef on the right and a patch nearly awash on the left, is 100 yards wide, and has from $3\frac{3}{4}$ to 4 fathoms on a coral bar, a cable outside the narrowest part.

Leading beacons.—Two leading beacons, in line when bearing N.E. by E. $\frac{1}{8}$ E., have been erected opposite the entrance to the port; that on the shore is a pyramid of masonry surmounted by an iron skeleton ball, the whole painted white. The back beacon is of similar construction but surmounted by a pole painted black.

Directions.—Bring the beacons in line and keeping them so, steer in through mid-channel of the narrow entrance; then, hugging the patch on the port hand, starboard the helm as soon as that patch is abeam to avoid another patch nearly awash a cable within the entrance on the starboard hand, and then anchor as convenient. It is well to have a boat ahead in entering this little port.

Dahalak Reefs.—On the northern side of the South Massawa channel, eastward of the narrows, these reefs stretch half a mile off Ras Kumbit, a low point of Dahalak island, and trend E.S.E. for 23 miles with a tolerably straight edge, though much shoaler in some parts than others.

Tree islets, 30 feet in height, are two conspicuous wooded islets E. by S. $\frac{1}{4}$ S. 6 miles from Ras Kumbit, and $1\frac{3}{4}$ miles inside the edge of the reef.

Museri is a coral island 35 feet high, its western end $16\frac{1}{2}$ miles E.S.E. of Ras Kumbit, and $1\frac{1}{2}$ miles within the edge of the Dahalak reef. The island is 3 miles long E. by S. and W. by N., and has a number of rocky islets off its south-eastern extreme.

Seil Anber lies S. by E. $\frac{3}{4}$ E. 6 miles from Ras Shoke, the south-eastern point of Dahalak island; it is a sandy islet 30 feet high and wooded, surrounded by a reef, and nearly round in shape. Between Seil Anber and Museri, distant $4\frac{1}{2}$ miles W. by N. $\frac{1}{2}$ N., there is a channel a mile wide, having from 5 to 9 fathoms.

See chart, No. 164, with plan of Port Smyth.

Bu-l-hissar is the south-eastern islet of the Dahalak group. It is low and sandy, about a mile in length, with a 4-fathoms rocky bank about half a mile north-westward of it. The southern entrance of the South Massawa channel is between this island and Ras Andadda, and is at this part about 22 miles wide; but the large reef, Shab Abu el Khosu, presently described, lies 6 to 9 miles south-westward of Bu-l-hissar, well out towards mid-channel.

Reefs.—From Museri island south-eastward, the northern boundary of the Massawa channel is prolonged by a series of detached reefs and banks as follows:—

At 6 miles S E. by S. from the south-eastern islet of Museri is a small coral shoal having a depth of less than 6 feet, steep-to on all sides.

Shab Abu el Khosu is a large coral reef 6 miles south-westward of Bu-l-hissar, which shows well. One part on its northern edge dries when the sea is low. It is $3\frac{1}{2}$ miles long N.N.W. and S.S.E., 2 miles wide, and steep-to all round, except to the southward, where a depth of 11 fathoms is found. Its southern point is in lat. $15^{\circ} 16\frac{1}{2}'$ N., long. $40^{\circ} 33'$ E., and bears N. $\frac{1}{2}$ E. $16\frac{1}{2}$ miles from Beach hill.

Shab Muhammed is a coral bank having a depth of 2 fathoms. It lies N.E. $\frac{1}{2}$ E. 13 miles from Beach hill, is 3 miles long in a N.W. and S.E. direction, and can be seen at some distance.

An 8-fathoms bank lies S.E. by S. 6 miles from the nearest part of Shab Muhammed.

Three-fathoms banks.—At 17 miles S.E. by E. from Shab Muhammed, and N.E. $\frac{1}{2}$ E. 14 miles from the outer Barm-al-Haji islet, is a large coral reef with 3 fathoms water. A bank of 6 fathoms stretching away in a south-easterly direction connects it with another 3-fathoms head, which bears S.E. by E. $\frac{1}{2}$ E. 5 miles from the former.

At 3 miles farther south-eastward, with its southern edge 12 miles N. by E. from Ras Shakhs, is an extensive bank of soundings of from 7 to 15 fathoms. This is known as the Seven-fathoms bank; it does not show.

CAUTION.—North-eastward of a line parallel with the trend of the shore, and passing through Shab Muhammed and the Three-fathoms bank, shoal patches are known to exist, and the examination of this locality has been of a very cursory nature; the mariner is therefore cautioned that its navigation is attended with considerable risk.

See charts, Nos. 164 and 143.

Shoals.—In the locality mentioned above, sand and coral shoals have been reported to exist in the following approximate positions:—

1. Of $3\frac{3}{4}$ fathoms in lat. $15^{\circ} 13' N.$, long. $40^{\circ} 47' E.$
2. „ $3\frac{3}{4}$ „ „ $15^{\circ} 10' N.$, „ $40^{\circ} 50\frac{1}{2}' E.$
3. „ $2\frac{3}{4}$ „ „ $15^{\circ} 11\frac{1}{2}' N.$, „ $40^{\circ} 53\frac{1}{2}' E.$
4. „ 3 „ „ $15^{\circ} 5' N.$, „ $41^{\circ} 1\frac{1}{2}' E.$
5. „ 2 „ „ $15^{\circ} 15' N.$, „ $41^{\circ} 16\frac{1}{2}' E.$
6. „ 4 „ „ $15^{\circ} 14' N.$, „ $41^{\circ} 21\frac{1}{2}' E.$
7. „ 5 „ „ $15^{\circ} 18\frac{1}{2}' N.$, „ $41^{\circ} 15\frac{1}{2}' E.$

These shoals are mostly one or two miles in extent, and it is probable that upon some of them, less water than stated above may exist.

Directions.—**South Massawa channel.**—Vessels bound to Massawa from the south-eastward are recommended to steer for Ras Maurekh, described at page 195, a high cliff with 9 fathoms water close to, but off which there are some 4-fathoms patches; and, passing southward of the shoals before described and outside the patches just mentioned, to keep the western and safer side of the channel on board. Having passed Umm Namus island, they may steer through the main channel between Shumma and Assarka islands, or between the latter and the mainland, but the main channel is preferable.

NORTHERN and EASTERN ISLANDS, DAHALAK BANK.—The description of the Massawa channel just completed, having included the islands on the Dahalak bank, commencing with Difnein, which border on its western and southern sides, that is to say, those, including Dahalak itself, which may be seen from, or which have to do with the navigation of, the Massawa channel; we now return to the northward, and starting again from Difnein, complete the description of this group with the northern and eastern islands.

Awali Shaura, S.E. by E. $\frac{3}{4}$ E. 20 miles from Difnein, is a small coral island about $1\frac{1}{4}$ miles long by half this in breadth, on a sand and coral bank 17 miles long E.N.E. and W.S.W., by about 4 miles broad. W. by S. $3\frac{1}{2}$ miles from Awali Shaura are some rocks 25 feet high, dark in colour and about half a mile in extent; and 4 miles E. $\frac{1}{2}$ S. from the same island, is a patch of $2\frac{1}{2}$ fathoms.

Awali Hutub, on the northern side of the sand and coral bank just mentioned, is 6 miles E.N.E. from Awali Shaura. Like the latter, it is of coral and is small.

Harmil is the north-eastern island on the Dahalak bank. Its eastern point is in lat. $16^{\circ} 32' N.$, long. $40^{\circ} 12' E.$ From thence it extends south-westward about 5 miles, and is upwards of 13 miles in circumference. It

See charts, Nos. 143 and 164.

is a low, woody, sand and coral island, with a deep bight on its northern side, forming a shallow salt lake. About 2 miles eastward of its southern end is a sand-bank called *Seil Harmil*, and about 2 miles westward of its southern point is *Enta-asnu*, a small, low, woody, sand and coral island, surrounded by a reef. These islands are situated upon a sand and coral bank 8 miles square, on which the soundings are very irregular, from one to 15 fathoms. The south-eastern point of this bank, with 3 and 4 fathoms water, extends to within 4 miles northward of *Enta-entor*.

Shoal patches of 3 fathoms, each about half a mile in extent, lie respectively S.E. by S. $4\frac{1}{4}$ miles, S.E. $\frac{1}{2}$ S. 5 miles, and E. $\frac{3}{4}$ N. 16 miles from *Seil Harmil*.

Romiya is about 5 miles westward of *Harmil*, and is a very small sand and coral island covered with wood. Between it and the bank of *Harmil* is a channel 2 miles wide, with 17 and 19 fathoms. W.N.W. of the island, $1\frac{1}{2}$, 5, and 8 miles distant respectively, are three dangerous rocky patches; the first with 3 fathoms, the second with 2 fathoms, and the other with one fathom on it, on which last the water breaks in blowing weather. There is also a breaking patch 8 miles W. by S. $\frac{1}{4}$ S. from *Romiya*, and it is surrounded by several other banks of 2 and 4 fathoms; but there is deep water near the island, and in fine weather the banks may generally be seen.

Asbab is a small, low, bushy, coral island, $1\frac{1}{2}$ miles southward of *Enta-asnu*, with a channel of from 12 to 19 fathoms between them. It is surrounded by a bank, and there is a sand and coral bank commencing one mile westward of it, which extends in a westerly direction 7 miles, and is 4 miles wide at its western end; its northern part is within 2 miles of the parallel of *Romiya* island, and it has patches of 2 fathoms; but there is a deep-water channel between it and *Asbab*. A shoal, about a mile in extent, with from one to 2 fathoms, lies 3 to 4 miles S.W. by W. from *Asbab*.

Hukale is a low, bushy, sand and coral island $4\frac{1}{2}$ miles S. $\frac{1}{4}$ W. from *Asbab*, and 8 miles W. $\frac{1}{2}$ N. from *Enta-entor*; a reef, upon which there is a 2-fathoms patch, extends nearly 2 miles W.S.W. from it, and a 7-fathoms patch lies S.W. by S. 3 miles from the island.

Enta-entor, its northern end in lat. $16^{\circ} 21' N.$, long. $40^{\circ} 14' E.$, lies 8 miles eastward of *Hukale*; it is a low, bushy, sand and coral island, with several shoals westward of it, viz.:—One N.W. by N. 4 miles, with 4 fathoms water; one bearing W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles, with less than 6 feet; and a 2-fathoms patch W. by S. 3 miles. This island, though small, has shoal water extending south-westward from it for $2\frac{1}{2}$ miles, and the 2-fathoms patch described is half a mile from the extreme end of it. Between the shoal extending off the south-western end of *Enta-entor* and

the reef extending northward from Ghabbi-hu, there is a narrow channel 6 fathoms deep.

Seil Anber, 4 miles westward of Hukale, is a small woody island, and $4\frac{1}{2}$ miles westward of it is Isra-tu. This latter island has on it some small peaked hills, and is one of the highest and largest on these banks, being 13 miles in circumference, and nearly divided into two by a small inlet on its northern side, which forms a salt-water lake. The island is principally composed of coral rock, and only affords a supply of firewood. N. by W. 3 miles from Isra-tu is a patch of $2\frac{1}{2}$ and 3 fathoms on the south-eastern part of a bank extending from thence to the northward $3\frac{1}{2}$ miles, where there are $3\frac{1}{2}$ fathoms, and westward, 5 miles, where there are 11 fathoms, and 45 fathoms close to.

Wustah island, $2\frac{1}{2}$ miles westward of Isra-tu, is $1\frac{1}{2}$ miles long, rather high, and is of coral rock; there are small rocky islets eastward of its northern and southern ends, and a 2-fathoms patch between it and Isra-tu. Isra-tu and Wustah are both on the same sand and coral bank, which is 10 miles long east and west, and from 3 to 4 miles wide, with from 8 to 10 fathoms on its eastern part about 3 miles E.S.E. from Isra-tu. There are from 5 to 7 fathoms between Isra-tu and Wustah, both eastward and westward of the 2-fathoms patch, and no bottom at 50 fathoms close to the south-western side of Isra-tu.

Tanam.—W.S.W. $3\frac{1}{2}$ miles from Wustah is Tanam island, about $1\frac{1}{2}$ miles in circumference and rather high. It is the largest islet of a rocky group lying westward and north-westward of it; one of which, Seil Tanam, has a small but remarkable peak. A rocky 2-fathoms patch lies $1\frac{1}{2}$ miles South from Tanam, and a large patch, $1\frac{1}{4}$ miles across, also with 2 fathoms, lies $3\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from that island.

Jerom.—S. by E. $5\frac{1}{2}$ miles from Tanam is this little island, and S. $\frac{1}{2}$ W. $9\frac{1}{2}$ miles from Tanam is another of the same description, Jarmat-ad da; these are all on one bank, whose length north and south is about $11\frac{1}{2}$ miles, and breadth westward of Jarmat-ad-da 9 miles.

Entufash, nearly 9 miles S. $\frac{1}{2}$ W. of Jerom, is a low sandy island, with a 2-fathoms shoal 2 miles N.N.E. $\frac{1}{4}$ E. from it.

Umm Ali is 6 miles W. by S. from Entufash, and is a small, low, bushy island of sandy formation. There appears to be an 11-fathoms channel through the shoals between the two islands. Westward of it, and $3\frac{3}{4}$ miles distant, is Seil Badira, a small, low, rocky islet, not to be confused with the islet of the same name on Shab Harat, described at page 201.

Abu Sherayir, Dahret,* and **Malak** are three small sandy islands from $3\frac{1}{2}$ to $5\frac{1}{2}$ miles northward of Seil Badira; the first two are

* Not to be confused with the Dahret described at page 201, though the two islands similarly named are within 11 miles of each other; nor with that at page 212.

See chart, No. 164.

low coral islands covered with wood, and there is a 2-fathoms channel between them. A sandy spit runs off the southern end of Abu Sherayir, and eastward of it, about one and 3 miles distant, are two rocky patches; another lies about one mile westward, and another midway between this island and Umm Ali. Malak is a low sandy island, with some bushes, separated from the others by a narrow channel of 9 and 8 fathoms; shoal water extends nearly 3 miles northward of this island.

Baradu.—About 3 miles southward of Seil Badira is Baradu, a low triangular island, 20 feet high, $3\frac{1}{2}$ miles in circumference, with a few dom trees on it, which, together with Dohul, Bahut, Dahret, and Dohul already described at page 201, are all on a bank of irregular soundings of from one to 12 fathoms, as will be seen by the chart.

Enta-idell, about 7 miles N.E. $\frac{1}{2}$ E. from Entufash, and 11 miles West from the northern point of Norah island, is a sandy and rocky island, with a shoal patch three-quarters of a mile westward of it, and a 12-fathoms channel between it and Norah.

Umm-es-Seil is $4\frac{1}{2}$ miles S.S.E. from Enta-idell, and $5\frac{1}{2}$ miles W. $\frac{1}{2}$ N. from the north-western point of Norah; this also is a sandy and rocky island; it has a 3-fathoms shoal one mile north-westward of it, and a 20-fathoms channel between it and Norah.

Seil Bala lies West $3\frac{1}{2}$ miles from Umm-es-Seil, and consists of high rocks.

Ento-ghodof, Adbara, and Adbara Kebir are three low sandy islands from 7 to 9 miles westward from the south-western point of Norah; they are on a shoal and rocky bank 4 miles in length N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. At 2 miles S.W. from the southernmost is a dangerous rocky one-fathom patch.

Dhu-l-bahur, Dhu-l-kuss, and Dahret Dhubanet.—In a S.S.E. direction from Adbara, at from 4 to 7 miles, are the small islands Dhu-l-bahur and Dhu-l-kuss on one sand and coral bank, and Dahret Dhubanet on another. There exists a channel of from 5 to 12 fathoms between them but it is too intricate to be considered navigable, nor is there any passage eastward of Dahret Dhubanet.

Dhu-rijrij is a small, low, woody island nearly midway between Dar Ghulla and Dhu-l-kuss. There are channels both northward and southward of this island.

Sarad is a rocky island of middling height, about $5\frac{1}{2}$ miles North of Entedebir, described at page 204, and connected with a point of Dahalak island by shoal water stretching off N.N.W. $3\frac{1}{2}$ miles from the point; the island being distant 2 miles from the shore. At $1\frac{1}{2}$ miles from Sarad in the direction of Dhu-rijrij is a 3-fathoms patch surrounded by depths of

17 and 19 fathoms; and N.N.W. about 2 miles from Sarad is another 3-fathoms patch. About 2 miles southward of Sarad, and half a mile from the point of Dahalak, is a one-fathom patch of rocks. Westward and north-westward of this patch, and also between it and Entedebir, is a deep hole in the bank of soundings, with 65 and 68 fathoms near its edges.

Dhu-l-aham island lies N. by E. 4 miles from Sarad, and about a mile N.W. from Ras Antarlero, the north-western point of Dahalak, with a narrow 2-fathoms passage between the island and point. Between these islands, the coast of Dahalak forms the deep bay called Ghubbet Entatu where there is anchorage, as already described at page 204. Dhu-l-aham is a low sand and coral island, and has a reef on its western, northern, and eastern sides; there is no passage between it and Dahret Dhubanet, westward of it.

NORAH ISLAND, the second largest island of the Dahalak group, lies northward of Dahalak, and is separated from its northern part by a space about 7 miles wide. The island is of sand and coral formation and has a few spots of date trees; it is about 12 miles long N. by W. and S. by E. and 7 miles wide; its circuit being 32 miles. There are two fishermen's villages on Norah; one on the south-western part, bearing the same name as the island, the other on the north-western part in a deep bay; the highest part of the island is westward of the village of Norah.

Water.—Good water may be obtained at the village in the north-western part of the island.

Great Bank.—Norah is situated on a very extensive bank having from one to 2 fathoms water, by which bank it is connected with Dahalak. There are several other islands on the same bank which stretches so far northward, that, as before remarked, it leaves no channel across the Dahalak bank southward of Enta-entor.

Dhu-ladhiya, Durafrus, Seil Betta, and Seil Norah.—Dhu-ladhiya, W.S.W. 3 miles from the south-eastern point of Norah; Durafrus and Seil Betta, about the same distance S.W. and West from Norah's south-western point; and Seil Norah, lying rather more northward and a mile from the western part of the same island, are all rocky islets near the edge of the shoal bank of Norah, with deep water at a mile south-westward and westward from them.

Jezirat Asghar, Seil Adasi, Norah Adasi, Dahret, Entvedúl, and Dhu-lalam are all on, or near the edge of the shoal bank of Norah, off the north-western and northern part of that island, from 2 to 6 miles distant. Some are low sandy islands, and others

rather high and rocky, with bushes. A rocky shoal of 2 fathoms lies S.S.W. about $1\frac{1}{4}$ miles from the southern end of Jezirat Asghar.

Nahelej is a long, low, sand and coral island off the north-eastern point of Norah, from which it is distant $1\frac{1}{2}$ miles. It is nearly 8 miles in length by 2 miles in extreme breadth, but nearly divided into two islands near the middle. About 7 miles eastward of its northern end is a 4-fathoms patch, having 14 fathoms near it.

Dahret Kubari, $1\frac{1}{2}$ miles northward from the northern end of Nahelej, is a low coral island about a mile in length. W. by N. $\frac{1}{2}$ N. 3 miles from its northern end is a rocky 2-fathoms patch, having 8 and 9 fathoms near it.

Ghabbi-hu.—Nearly 2 miles north-eastward of Dahret Kubari is Ghabbi-hu, a low sand and coral island, with a few bushes on it; it is about $2\frac{1}{2}$ miles in length, north-east and south-west, but has an arm stretching 2 miles south-eastward from the main body of the island, and forming a bight on its eastern side. It is on and near the north-eastern extreme of the Norah Great bank, which extends about a mile beyond its north-eastern end. The southern end of Enta-entor island is $2\frac{1}{2}$ miles northward of the northern extreme of Ghabbi-hu.

Mahun, a low sand and coral island about 8 miles in circuit, lies East from the central part of Norah, the nearest point of which is a mile distant.

Dhu-l-fidol, also low, sandy, and of coral, lies S.E. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from Mahun. A bank of shoal water extends E.S.E. nearly 3 miles from Dhu-l-fidol. Between Dhu-l-fidol and the nearest point of Norah, distant 9 miles, there are several low sandy islands or banks, without names.

Dhu-l-ankibat, 7 miles E. by S. $\frac{1}{2}$ S. from the south-eastern point of Norah, is a low sandy island $1\frac{1}{2}$ miles long in an easterly and westerly direction and is surrounded by a reef extending 3 miles E.S.E. from it.

Martaban, a low sandy island $1\frac{1}{2}$ miles long, lies W. by S. $\frac{1}{2}$ S. 3 miles from Dhu-l-ankibat.

Dergoman Seghir and **Dergoman Kebir**.—At 3 miles south-westward of Martaban are Dergoman Seghir and Dergoman Kebir. The former is a low sandy island, the latter high and rocky, with wood on its south-eastern part. They are about $1\frac{1}{2}$ miles off the north-eastern point of Dahalak, and have shoal water all about them.

Dhu-lalam, distant about a mile from the south-eastern point of Norah, is 3 miles long in a N. $\frac{1}{2}$ W. direction, and about one mile wide; it is low, sandy, and surrounded by shoal water. There is a fishing village on it, and two small sand-banks between it and Martaban.

Akrab islands.—These are two low and sandy islands, one lying S. $\frac{1}{2}$ W. 2 miles, the other S.S.E. $2\frac{1}{2}$ miles from Dhu-l-ankibat.

Dhu-l-kos.—S. by E. 3 miles from the eastern Akrab is Sayin island or Dhu-l-kos, which is 2 miles long, rather high and rocky, and surrounded by shoal water on the Dahalak reef. N.N.E. $1\frac{1}{2}$ miles from it, and on the same reef, is the little islet Dahret Dulke.

Seil Sikan is a high and barren coral island, $2\frac{1}{2}$ miles north-eastward of Ras Kusum on the island of Dahalak, and 4 miles W. by N. $\frac{1}{2}$ N. from the south-western end of Sayin; it is narrow at the base and spreads out at the top, and is near the eastern edge of the bank forming the western side of the narrow channel leading to Dhu-Bellu anchorage.

Erwa is a moderately high, flat, coral island, about 12 miles in circumference; it is separated from the north-eastern side of Dahalak by a very narrow boat channel, and has on it a few fishermen's huts. On its southern side is a land-locked salt-water lake, $3\frac{1}{2}$ miles long by 2 miles wide, with from 4 to 6 fathoms water; this is connected with the sea on the eastern side by the boat channel before mentioned, and, on the western side by a gut, with from 3 to 6 fathoms, leading into the anchorage off Dhu-Bellu and from thence to the sea.

Dhu-Bellu anchorage is an oval opening in the reef about 2 miles south-eastward of the town. The narrow entrance to this place begins about a mile south-eastward of Seil Sikan island, where for a short space the two reefs nearly meet; after passing through this passage there is an open space about 2 miles in length, when the channel again becomes very narrow, and from thence the coast reef must be kept close on board in order to avoid the shoal part of the banks to the eastward. The channel is extremely narrow, and north-eastward of Dhu-Bellu there is very little more than one fathom in depth, and that over rocky bottom; elsewhere the depths in the channel are from 4 to 7 fathoms, and, in the anchorage, from 3 to 6 fathoms. The rush of tidal water through this channel in and out of the large salt-water lake southward of Erwa is of considerable force.

Derom lies E. by S. $\frac{1}{2}$ S. $6\frac{1}{2}$ miles from Dhu-l-ankibat. It is a small, low, sandy island, on the centre of a bank of shoal water nearly 6 miles long and extending E.S.E. and W. by S. from the island. There is also a shoal rocky patch lying N.E. by N. $3\frac{1}{2}$ miles from Derom.

Dha-n-nafarik is a small but high and rocky island 3 miles S. $\frac{1}{2}$ W. from Derom; it is on a rocky bank extending one mile N.E. and 2 miles S.W. from the island.

Seil Arabi is $2\frac{1}{2}$ miles distant from the shore of Dahalak island, and lies S.W. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles from the southern point of Dha-n-nafarik. This

is a small, high, rocky island of coral formation, surrounded by shoal water, but with a 7-fathoms channel between it and the Dahalak reef. N.N.E. $\frac{1}{2}$ E. $1\frac{3}{4}$ miles from Seil Arabi is a small rocky patch, another lies North $2\frac{3}{4}$ miles from the same island, and a third, half a mile from its north-western shore.

Yermalkau is a small island surrounded by a reef, $4\frac{1}{2}$ miles S.E. by E. from Seil Arabi, and E. by S. $\frac{1}{2}$ S. $8\frac{1}{2}$ miles from the latter is Senach island, also surrounded by a reef. N. $\frac{1}{2}$ E. 2 miles from Yermalkau there is a rocky patch.

Dhu-lakal lies N.E. by N. 2 miles from Senach, and Gharib N. by W. $4\frac{1}{2}$ miles from the same. These are two low sandy islands 3 miles apart, situated on the same bank of shoal water, which is 6 miles long in a north-westerly direction, and nearly $2\frac{1}{2}$ miles wide.

Dhu-l-kuff lies N.E. $3\frac{1}{2}$ miles from Gharib, and is a low sandy island with a few bushes on it. A reef extends from it N.E. and East 2 miles; and, W. $\frac{1}{2}$ N. one mile from its western end there is a large rocky patch.

Dhu-l-bia is a small, low, sandy island, surrounded by shoal water, which extends 2 miles southward of the island. About 3 miles E.S.E. from it is a shoal rocky patch.

Dhu-nishub.—S. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from Dhu-l-bia is Dhu-nishub, a low and sandy island with only a narrow fringing reef around it.

Howeit island, encircled by a reef, is $4\frac{1}{2}$ miles S.E. by E. $\frac{1}{2}$ E. from Ras Shoke, the south-eastern point of Dahalak.

Umm-en-Nayim, Darraka-el-Bahr and Darraka-el-Barr.—From Howeit, in the directions N.E. by N., N. $\frac{1}{2}$ E., and N.N.W. $\frac{1}{4}$ W., at distances of from 2 to $4\frac{1}{2}$ miles, lie these three small islands. Umm-en-Nayim is at the north-western end of a reef $3\frac{1}{2}$ miles in length, and very shallow; it is the only island between Seghala and Howeit which has on it no growth of scrub or brushwood; Darraka-el-Bahr is surrounded by reef; and, Darraka-el-Barr is $2\frac{1}{2}$ miles north-eastward of Ras Shoke and on the Dahalak island reef. All these islands are low and sandy. The south-eastern extreme of Umm-en-Nayim reef bears E. by S. $\frac{1}{4}$ S. 9 miles from Ras Shoke.

Hawatib and Hawatib Kebir are two low sandy bushy islands, lying 4 and 5 miles north-eastward from Dhu-l-kuff. Shoal water extends upwards of a mile eastward from Hawatib Kebir, and a 3-fathoms shoal lies half a mile from its south-western part. E. $\frac{1}{4}$ N. 5 miles from the same island is a 2-fathoms shoal, and E. by N. 6 miles is another with 3 fathoms least water. N.E. by E. $8\frac{1}{2}$ miles from the eastern end of

Hawatib Kebir is a shoal rocky patch outside all the islands in this vicinity; its centre is in lat. $15^{\circ} 58\frac{1}{2}'$ N., long. $40^{\circ} 43'$ E.

Bilha, about 6 miles E. by S. $\frac{1}{2}$ S. from Dhu-l-bia is a low, sandy, island about $1\frac{1}{2}$ miles long, on a dangerous shoal extending $4\frac{1}{2}$ miles north-eastward and $1\frac{1}{2}$ miles south-westward from the island.

Rijyuma is $5\frac{1}{2}$ miles S.S.W. $\frac{1}{4}$ W. from Bilha, and about 2 miles S.S.W. from Rijyuma is Maharib, another small island surrounded by a narrow reef; both islands are low.

Seghala is about 3 miles long and one mile wide, its northern side forming a bight. It is a low sandy and bushy island on a shallow bank which extends from $1\frac{3}{4}$ to $2\frac{1}{2}$ miles from its northern side, and one mile south-eastward from its eastern end. From observations made by H.M.S. *Dolphin*, in 1887, there appears to be a rise and fall of tide of about 3 feet at this island, but no perceptible tidal stream.*

Raka, a low sand and coral island, with a bluff of bushes on its eastern end, lies 3 miles S.W. by W. from Seghala, and about one mile eastward of Rijyuma. There is a 7-fathoms channel between Raka and Seghala.

Dahret Seghala, a low sandy and bushy island, about one mile long east and west, and having a reef extending a mile from its northern side, is 3 miles southward of Seghala.

Mustamila is 3 miles south-westward of Dahret Seghala; it is a small, high, sandy island, with a reef extending a mile north-eastward, and also round its northern side and western end.

Zauber, South $2\frac{1}{2}$ miles from Dahret Seghala, is also a high and sandy island, with a reef extending a mile northward and westward from it.

Salima is a high rocky island about $2\frac{1}{2}$ miles long E. by N. and W. by S., and about a mile wide. It lies South 3 miles from Zauber and has a narrow reef on its northern side.

Hatitau is $3\frac{1}{2}$ miles West from Salima. This is a high rocky island about 2 miles in length north and south and one mile wide, with a reef on its eastern side. About 3 miles westward of its northern end is Tor island.

Tor island, about 6 feet high and rocky, with a break in parts towards the eastern end converting it into two islands at high water, is about 2 miles long E. by N. and W. by S., and one mile wide. The reef

* In 1887, the wreck of the s.s. *Graville* was lying sunk about 2 miles northward of this island, in 3 fathoms water. The north-eastern point of the island bore S.S.E. from the wreck. The mast and funnel were still standing, and it was not thought likely the wreck would break up for some time.

See charts, Nos. 164 and 8d.

extends eastward and westward, and for some distance on its southern side where a large portion dries at low water; there is good anchorage in about 5 fathoms within half a mile of the shore on the north-western side.

Mojeidi, in lat. $15^{\circ} 30' N.$, long. $40^{\circ} 50' E.$, is the south-easternmost island on the Dahalak bank; it is a high rocky island about $1\frac{1}{2}$ miles in length north and south, and nearly a mile wide.

Aukan.—About one mile westward of Mojeidi is Aukan, also a high rocky island, about $3\frac{1}{2}$ miles long E.N.E. and W.S.W., and one mile wide; it has but little reef around it.

Dhu-l-kurush, W. by S. from Aukan and separated from it by a 12-fathoms channel $1\frac{1}{2}$ miles wide, is high and rocky, of triangular shape, and surrounded by a reef.

Mashilagha, a small but high rocky island surrounded by a reef, widest on its south-eastern side, lies S.S.W. nearly 2 miles from Dhu-l-kurush; there are from 12 to 20 fathoms water between them.

Shab Ali.—There is water of a navigable depth, from 5 to 15 fathoms, between all the islands and their reefs south-eastward of Derom, on the Dahalak bank, that have been described, but vessels approaching from the eastward must be careful to avoid a shoal and dangerous bank called Shab Ali. Its south-western end lies about 4 miles E. by S. from Zauber, and from thence it, and the bank of which it forms a part, extends E. $\frac{1}{2}$ S. for 10 miles, and N.N.W. about 10 miles, approaching within 2 miles of Dahret Seghala, with from 9 to 15 fathoms close to its western edge. Shab Ali shoal itself, is, in its widest part about 2 miles across, but the bank on which it is situated is about 9 miles wide, having 17 fathoms close to its eastern edge; it has several patches, and various depths on it, which, as well as the depths between the islands, will be best understood by consulting the chart.

South-eastward from Shab Ali bank, at the distance of 3 and 9 miles from its south-eastern point, there are patches of 3 fathoms, the more distant of which is in lat. $15^{\circ} 29' N.$, long. $41^{\circ} 5' E.$

Outlying Shoals on the Dahalak Bank.—In addition to the shoals already mentioned as lying near the North and South Massawa channels or their approaches, there are some outlying patches on the eastern side of the Dahalak bank which require notice. A shoal of 4 fathoms is situated in lat. $16^{\circ} 51' N.$, long. $39^{\circ} 55' E.$, and one of 5 fathoms, sand and coral, in lat. $16^{\circ} 47' N.$, long. $40^{\circ} 11' E.$ East 15 miles from the eastern end of Harmil island, in lat. $16^{\circ} 33' N.$, long. $40^{\circ} 28' E.$, there are patches of 3 and 4 fathoms depth, with one of 5 fathoms S. by E. $\frac{1}{2}$ E. 4 miles from the above position. In lat. $16^{\circ} 10' N.$, long. $40^{\circ} 43' E.$, there is a patch of 5 fathoms (and probably less depth)

See chart, No. 8d.

surrounded by soundings of 22, 19, and 9 fathoms. Besides these, there is a cluster of shoals near the south-eastern extreme of the Dahalak bank, the outer one of 4 fathoms being 32 miles S.W. by W. $\frac{1}{4}$ W. from Jebel Teir island. Five miles W.N.W. from this latter shoal is a patch with only 2 fathoms water. From this will be seen the necessity for the caution enjoined at page 198.

Having now concluded the description of the Dahalak bank with its innumerable islets, reefs, and shoals, we return to that of the western shore of the Red sea commencing from Ras Shakhs, the point at which this description had arrived at page 198.

The Coast from Ras Shakhs takes a S.E. by S. direction for 47 miles, after which appears the bight, at the head of which is the village of Eid. It then takes a more easterly direction for 35 miles to Rakhmat island, but with two deep indentations within this space. It then resumes a general S.E. $\frac{1}{2}$ S. direction for 90 miles to the strait of Bab-el-Mandeb, this length of coast again being broken by the two deep bays of Beilul and Asab.

Aspect of the land.—In the whole of the space here mentioned the background is composed of ranges of high volcanic mountains sloping down to the sea. In the northern part, north-westward of Ras Sirbut, is the highest of the near range of hills, with an elevation at each extreme; the highest part is seen from a little below Hanfela to a little northward of Eid. Jebel Kosar, 2,300 feet high, bears S.W. $\frac{1}{4}$ S. $9\frac{1}{2}$ miles from Ras Kosar, and is 9 miles from the shore. A lower peak is on the same line of bearing from Jebel Kosar, and 2 miles nearer the Ras; on a westerly bearing, the two show as a double peak. Rugged peak is about 5 miles south-eastward of Jebel Kosar, and has a broken irregular top, with a sharp small point on its western part; it is, however, not very distinguishable from the northward.

Ras Sirbut is 32 miles south-eastward of Ras Shakhs. Between these two places the water shoals gradually towards the shore, with the exception of a 4-fathoms patch 2 miles from the shore, and about $5\frac{1}{2}$ miles north-westward of Ras Kosar. A few miles on each side of this shoal spot the 10-fathoms contour-line of soundings is about 2 miles from the shore.

JEZIRAT KURDUMIYAT, in lat. $14^{\circ} 7' N.$, long. $41^{\circ} 39\frac{1}{2}' E.$, is a rugged bluff island about 180 feet high and 8 cables in diameter; it bears S.E. 13 miles from Ras Sirbut, and its inner side is $2\frac{1}{2}$ miles distant from the shore. In coasting from the north-westward, it is the first island met with after passing Daramsas island off Hanfela bay. A rocky spit extends off its western end $1\frac{1}{2}$ miles, leaving a channel of from 5 to 9 fathoms between it and the shore; a rock on the reef is about 10 feet high, and when seen from certain directions has the appearance of a large boat cut in two.

At $1\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. from Kurdumiyat are three small rocky islands, 100 feet high, on one shoal bank. There is a channel between these islets and Kurdumiyat, where there are 4 to 14 fathoms, and between the islands and the shore, there is a narrow passage having from 5 to 6 fathoms.

Under the lee of Kurdumiyat there is anchorage with the extreme of its reef bearing East one mile.

Water.—During the rainy season, good water may be had on the mainland from a Wadi or valley nearly opposite Kurdumiyat.

EID.—This village stands on the sandy plain in the western bight of the coast, 10 miles S. $\frac{1}{2}$ W. from Jezirat Kurdumiyat; it consists principally of grey oblong huts with arched tops and an outer covering of coarse grass mats; there are a few small white stone buildings at the northern end of the village, and a small mosque and minaret at the southern end. It is of no great extent, but has a considerable trade with Mokha in mats, rafters, ghee, and goatskins.

Anchorage.—In 1880, H.M.S. *Seagull* anchored off Eid in 3 fathoms water, with the extreme of the bay bearing E.S.E., and Jezirat Kurdumiyat, North. The water shoals gradually in approaching the bay, and there are 3 fathoms water between the anchorage mentioned and the eastern extreme of the bay. Good cattle may be had here by waiting a day or two, but the water is brackish.

About 3 miles eastward of Eid, there is a bight similar to that in which Eid stands, the land between the bights forming a square rocky headland of a dark colour with regular soundings off it.

JEZIRAT KAD ALI.—The western of these two islands, 150 feet high and not much more than half a mile in diameter, bears S.E. $\frac{1}{2}$ S. 13 miles from Jezirat Kurdumiyat, and is $1\frac{3}{4}$ miles from the shore, with which it is connected by a spit of sand and rocks extending nearly a mile seaward beyond the island. The eastern island, 80 feet high, lies E.S.E. 2 miles from the other, and is steep-to.

Shoal.—About $2\frac{1}{2}$ miles westward of Jezirat Kad Ali is a shoal of 5 fathoms from which the north extreme of that island bears E. $\frac{1}{2}$ S.; the north extreme of Barn rock E. by N. $\frac{1}{4}$ N.; and the east extreme of Jezirat Kurdumiyat N.N.W. $\frac{1}{2}$ W.

The shoal southward and westward of Kad Ali seems to be increasing; a long narrow spit extends in a westerly direction towards the 5-fathoms shoal mentioned, but there is deep water between them.

Barn rock, 10 feet high and almost steep-to, lies N.E. $2\frac{1}{2}$ miles from the western Kad Ali island. There is a 20-fathoms channel between them.

the reef extending northward from Ghabbi-hu, there is a narrow channel 6 fathoms deep.

Seil Anber, 4 miles westward of Hukale, is a small woody island, and $4\frac{1}{2}$ miles westward of it is Isra-tu. This latter island has on it some small peaked hills, and is one of the highest and largest on these banks, being 13 miles in circumference, and nearly divided into two by a small inlet on its northern side, which forms a salt-water lake. The island is principally composed of coral rock, and only affords a supply of firewood. N. by W. 3 miles from Isra-tu is a patch of $2\frac{1}{2}$ and 3 fathoms on the south-eastern part of a bank extending from thence to the northward $3\frac{1}{2}$ miles, where there are $3\frac{1}{2}$ fathoms, and westward, 5 miles, where there are 11 fathoms, and 45 fathoms close to.

Wustah island, $2\frac{1}{2}$ miles westward of Isra-tu, is $1\frac{1}{2}$ miles long, rather high, and is of coral rock; there are small rocky islets eastward of its northern and southern ends, and a 2-fathoms patch between it and Isra-tu. Isra-tu and Wustah are both on the same sand and coral bank, which is 10 miles long east and west, and from 3 to 4 miles wide, with from 8 to 10 fathoms on its eastern part about 3 miles E.S.E. from Isra-tu. There are from 5 to 7 fathoms between Isra-tu and Wustah, both eastward and westward of the 2-fathoms patch, and no bottom at 50 fathoms close to the south-western side of Isra-tu.

Tanam.—W.S.W. $3\frac{1}{2}$ miles from Wustah is Tanam island, about $1\frac{1}{2}$ miles in circumference and rather high. It is the largest islet of a rocky group lying westward and north-westward of it; one of which, Seil Tanam, has a small but remarkable peak. A rocky 2-fathoms patch lies $1\frac{1}{2}$ miles South from Tanam, and a large patch, $1\frac{1}{4}$ miles across, also with 2 fathoms, lies $3\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from that island.

Jerom.—S. by E. $5\frac{1}{2}$ miles from Tanam is this little island, and S. $\frac{1}{2}$ W. $9\frac{1}{2}$ miles from Tanam is another of the same description, Jarmat-ad da; these are all on one bank, whose length north and south is about $11\frac{1}{2}$ miles, and breadth westward of Jarmat-ad-da 9 miles.

Entufash, nearly 9 miles S. $\frac{1}{2}$ W. of Jerom, is a low sandy island, with a 2-fathoms shoal 2 miles N.N.E. $\frac{1}{4}$ E. from it.

Umm Ali is 6 miles W. by S. from Entufash, and is a small, low, bushy island of sandy formation. There appears to be an 11-fathoms channel through the shoals between the two islands. Westward of it, and $3\frac{3}{4}$ miles distant, is Seil Badira, a small, low, rocky islet, not to be confused with the islet of the same name on Shab Harat, described at page 201.

Abu Sherayir, **Dahret**,* and **Malak** are three small sandy islands from $3\frac{1}{2}$ to $5\frac{1}{2}$ miles northward of Seil Badira; the first two are

* Not to be confused with the Dahret described at page 201, though the two islands similarly named are within 11 miles of each other; nor with that at page 212.

See chart, No. 164.

low coral islands covered with wood, and there is a 2-fathoms channel between them. A sandy spit runs off the southern end of Abu Sherayir, and eastward of it, about one and 3 miles distant, are two rocky patches; another lies about one mile westward, and another midway between this island and Umm Ali. Malak is a low sandy island, with some bushes, separated from the others by a narrow channel of 9 and 8 fathoms; shoal water extends nearly 3 miles northward of this island.

Baradu.—About 3 miles southward of Seil Badira is Baradu, a low triangular island, 20 feet high, $3\frac{1}{2}$ miles in circumference, with a few dom trees on it, which, together with Dohul, Bahut, Dahret, and Dohul already described at page 201, are all on a bank of irregular soundings of from one to 12 fathoms, as will be seen by the chart.

Enta-idell, about 7 miles N.E. $\frac{1}{2}$ E. from Entufash, and 11 miles West from the northern point of Norah island, is a sandy and rocky island, with a shoal patch three-quarters of a mile westward of it, and a 12-fathoms channel between it and Norah.

Umm-es-Seil is $4\frac{1}{2}$ miles S.S.E. from Enta-idell, and $5\frac{1}{2}$ miles W. $\frac{1}{2}$ N. from the north-western point of Norah; this also is a sandy and rocky island; it has a 3-fathoms shoal one mile north-westward of it, and a 20-fathoms channel between it and Norah.

Seil Bala lies West $3\frac{1}{2}$ miles from Umm-es-Seil, and consists of high rocks.

Ento-ghodof, Adbara, and Adbara Kebir are three low sandy islands from 7 to 9 miles westward from the south-western point of Norah; they are on a shoal and rocky bank 4 miles in length N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. At 2 miles S.W. from the southernmost is a dangerous rocky one-fathom patch.

Dhu-l-bahur, Dhu-l-kuss, and Dahret Dhubanet.—In a S.S.E. direction from Adbara, at from 4 to 7 miles, are the small islands Dhu-l-bahur and Dhu-l-kuss on one sand and coral bank, and Dahret Dhubanet on another. There exists a channel of from 5 to 12 fathoms between them but it is too intricate to be considered navigable, nor is there any passage eastward of Dahret Dhubanet.

Dhu-rijrij is a small, low, woody island nearly midway between Dar Ghulla and Dhu-l-kuss. There are channels both northward and southward of this island.

Sarad is a rocky island of middling height, about $5\frac{1}{2}$ miles North of Entedebir, described at page 204, and connected with a point of Dabalak island by shoal water stretching off N.N.W. $3\frac{1}{2}$ miles from the point; the island being distant 2 miles from the shore. At $1\frac{1}{2}$ miles from Sarad in the direction of Dhu-rijrij is a 3-fathoms patch surrounded by depths of

17 and 19 fathoms; and N.N.W. about 2 miles from Sarad is another 3-fathoms patch. About 2 miles southward of Sarad, and half a mile from the point of Dahalak, is a one-fathom patch of rocks. Westward and north-westward of this patch, and also between it and Entedebir, is a deep hole in the bank of soundings, with 65 and 68 fathoms near its edges.

Dhu-l-aham island lies N. by E. 4 miles from Sarad, and about a mile N.W. from Ras Antarlero, the north-western point of Dahalak, with a narrow 2-fathoms passage between the island and point. Between these islands, the coast of Dahalak forms the deep bay called Ghubbet Entatu where there is anchorage, as already described at page 204. Dhu-l-aham is a low sand and coral island, and has a reef on its western, northern, and eastern sides; there is no passage between it and Dahret Dhubanet, westward of it.

NORAH ISLAND, the second largest island of the Dahalak group, lies northward of Dahalak, and is separated from its northern part by a space about 7 miles wide. The island is of sand and coral formation and has a few spots of date trees; it is about 12 miles long N. by W. and S. by E. and 7 miles wide; its circuit being 32 miles. There are two fishermen's villages on Norah; one on the south-western part, bearing the same name as the island, the other on the north-western part in a deep bay; the highest part of the island is westward of the village of Norah.

Water.—Good water may be obtained at the village in the north-western part of the island.

Great Bank.—Norah is situated on a very extensive bank having from one to 2 fathoms water, by which bank it is connected with Dahalak. There are several other islands on the same bank which stretches so far northward, that, as before remarked, it leaves no channel across the Dahalak bank southward of Enta-entor.

Dhu-ladhiya, Durafrus, Seil Betta, and Seil Norah.—Dhu-ladhiya, W.S.W. 3 miles from the south-eastern point of Norah; Durafrus and Seil Betta, about the same distance S.W. and West from Norah's south-western point; and Seil Norah, lying rather more northward and a mile from the western part of the same island, are all rocky islets near the edge of the shoal bank of Norah, with deep water at a mile south-westward and westward from them.

Jezirat Asghar, Seil Adasi, Norah Adasi, Dahret, Entvedúl, and Dhu-lalam are all on, or near the edge of the shoal bank of Norah, off the north-western and northern part of that island, from 2 to 6 miles distant. Some are low sandy islands, and others

rather high and rocky, with bushes. A rocky shoal of 2 fathoms lies S.S.W. about $1\frac{3}{4}$ miles from the southern end of Jezirat Asghar.

Nahelej is a long, low, sand and coral island off the north-eastern point of Norah, from which it is distant $1\frac{1}{2}$ miles. It is nearly 8 miles in length by 2 miles in extreme breadth, but nearly divided into two islands near the middle. About 7 miles eastward of its northern end is a 4-fathoms patch, having 14 fathoms near it.

Dahret Kubari, $1\frac{1}{2}$ miles northward from the northern end of Nahelej, is a low coral island about a mile in length. W. by N. $\frac{1}{2}$ N. 3 miles from its northern end is a rocky 2-fathoms patch, having 8 and 9 fathoms near it.

Ghabbi-hu.—Nearly 2 miles north-eastward of Dahret Kubari is Ghabbi-hu, a low sand and coral island, with a few bushes on it; it is about $2\frac{1}{2}$ miles in length, north-east and south-west, but has an arm stretching 2 miles south-eastward from the main body of the island, and forming a bight on its eastern side. It is on and near the north-eastern extreme of the Norah Great bank, which extends about a mile beyond its north-eastern end. The southern end of Enta-entor island is $2\frac{1}{2}$ miles northward of the northern extreme of Ghabbi-hu.

Mahun, a low sand and coral island about 8 miles in circuit, lies East from the central part of Norah, the nearest point of which is a mile distant.

Dhu-l-fidol, also low, sandy, and of coral, lies S.E. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from Mahun. A bank of shoal water extends E.S.E. nearly 3 miles from Dhu-l-fidol. Between Dhu-l-fidol and the nearest point of Norah, distant 9 miles, there are several low sandy islands or banks, without names.

Dhu-l-ankibat, 7 miles E. by S. $\frac{1}{2}$ S. from the south-eastern point of Norah, is a low sandy island $1\frac{1}{2}$ miles long in an easterly and westerly direction and is surrounded by a reef extending 3 miles E.S.E. from it.

Martaban, a low sandy island $1\frac{1}{2}$ miles long, lies W. by S. $\frac{1}{2}$ S. 3 miles from Dhu-l-ankibat.

Dergoman Seghir and **Dergoman Kebir**.—At 3 miles south-westward of Martaban are Dergoman Seghir and Dergoman Kebir. The former is a low sandy island, the latter high and rocky, with wood on its south-eastern part. They are about $1\frac{1}{2}$ miles off the north-eastern point of Dahalak, and have shoal water all about them.

Dhu-lalam, distant about a mile from the south-eastern point of Norah, is 3 miles long in a N. $\frac{1}{2}$ W. direction, and about one mile wide; it is low, sandy, and surrounded by shoal water. There is a fishing village on it, and two small sand-banks between it and Martaban.

Appearance of the land.—**Haycock hill**, 833 feet high, is a mile from the coast about 7 miles south-eastward of the Kad Ali islands. E. by N. $\frac{3}{4}$ N. from the Haycock are two other hills, also conical, but not quite so high; they all appear as one on a W. by S. $\frac{3}{4}$ S. bearing. About 3 miles S.E. from Haycock hill is a round-topped hill, 586 feet high, and 3 miles farther to the south-east is a conical hill; E. by S. 3 miles from the latter is Ras Sherayir.

RAS SHERAYIR, in lat. $13^{\circ} 46'$ N., long. $42^{\circ} 1\frac{1}{2}'$ E., is a remarkable brown volcanic hill with a flat top, about 200 feet high; it is close to the beach, and near it on the southern side is a sand-hill.

Sharp peak.—About 17 miles S.W. $\frac{3}{4}$ W. from Ras Sherayir is a very remarkable conical mountain about 5,403 feet high; S.S.W. 5 miles from this is another, 5,083 feet high, with a sharp peak on its south-western end; and S.W. by S. $7\frac{1}{2}$ miles farther on again is a smooth-topped mountain 6,990 feet in height, and 27 miles from the nearest part of the coast, southward of Ras Sherayir.

JEBEL ABAYIL ISLANDS.—Saddle island, the western island of these two, is 403 feet high, and lies S.E. by E. $4\frac{1}{2}$ miles from East Kad Ali island; both islands lie adjacent to the shore near Haycock hill. Saddle island is so named from its having a saddle-topped hill on its eastern end; it is separated from the mainland by a narrow channel fit only for boats. The eastern and larger island, Jebel Abayil, has three hummocks, the western one being 388 feet high; both islands are volcanic. Between Jebel Abayil, which is encircled by a reef, and the shore, $1\frac{1}{2}$ miles distant, there are from 12 to 17 fathoms, and 17 fathoms between the two islands; but these channels are much narrowed by the island's reef.

Scilla bank, more than 3 miles westward from Saddle island, and its inner end only a mile from the shore, extends from thence about $1\frac{1}{2}$ miles in a northerly direction, with a depth of $3\frac{1}{2}$ fathoms; this bank lies well in-shore of a line connecting Saddle island with East Kad Ali island.

Anchorage.—Westward of the Jebel Abayil islands there is good anchorage in $7\frac{1}{2}$ fathoms, with Haycock hill bearing S. by E., and Saddle island E.N.E. The anchorage northward of these islands is also reported to be good, with smooth water, during southerly winds. There is good seining on the flood tide.

Button rock, 58 feet high, is $2\frac{1}{2}$ miles S.E. $\frac{3}{4}$ S. from the north-east end of Jebel Abayil island.

From Bahr Assúb, about $3\frac{1}{2}$ miles south-eastward of Ras Sherayir, the coast trends S. by E. $\frac{1}{2}$ E. about 6 miles, and then E. by N. $\frac{1}{2}$ N. 6 miles to the eastern extreme of Rakhmat island, forming a deep bight, off and in which are many rocks and islets, as presently described; the

general depths in this bay are from 6 to $3\frac{1}{2}$ fathoms, and it has good anchorage ground.

Quoin islands.—Lying off the deep bight just described, and bearing E. by S. $\frac{1}{4}$ S. $6\frac{1}{2}$ miles from Ras Sherayir, is the North-west Quoin, the westernmost and highest of a group of three white rocky islets; it is 175 feet high, and is in lat $13^{\circ} 45' N.$, long. $42^{\circ} 8\frac{1}{2}' E.$ The North-east Quoin is 153 feet high, and lies East one mile from the North-west Quoin. The South Quoin is 79 feet high, and bears S.S.E. $\frac{1}{4}$ E., one mile from the North-west Quoin. Quoin rock lies S.W. by W. $\frac{1}{4}$ W. $1\frac{1}{4}$ miles from the South Quoin, and is only about one foot above low water, but can generally be seen. All these rocky islands have from 4 to 5 fathoms water close to, increasing rapidly to 7 fathoms and upwards. The Quoin rock is the nearest to the shore, from which it is distant 3 miles.

RAKHMAT ISLAND bears S.E. by E. $11\frac{1}{2}$ miles from Ras Sherayir. It is the eastern and highest of a chain of small islets and rocks mostly connected with each other, and nearly so with the shore at low water; they form the southern side of the deep bight just described, and have the appearance of being a continuation of a range of hills extending in a north-easterly direction from the high land to the shore. Rakhmat is nearly a mile in length north-west and south-east; its summit is 282 feet high and appears double when viewed from the north-eastward. Some rocky patches, on which there are less than 3 fathoms, extend 5 cables from it in a northerly and north-easterly direction. Also, at $1\frac{3}{4}$ miles N.E. $\frac{1}{2}$ N. from the summit of the island, there is a patch of $4\frac{1}{4}$ fathoms coral and sand, with deeper water between it and the island.

Williamson island, 159 feet high, lies W. by N. $5\frac{3}{4}$ miles from the summit of Rakhmat island, and about one mile from the shore abreast of it in the bight, from whence shoal water extends 6 cables towards it; a shoal with $1\frac{1}{2}$ fathoms water extends 5 cables southward from the island. There is a $4\frac{1}{4}$ -fathoms channel nearly 3 cables wide between the shore and island reefs, but the approach to it has half a fathom less water.

Bird island, 38 feet high, is $1\frac{1}{3}$ miles E. $\frac{1}{4}$ N. from Williamson island; it has from $2\frac{1}{2}$ to 4 fathoms a cable distant from it all round.

With the exception of one little rocky islet 32 feet high, and bearing W. $\frac{3}{4}$ N. 2 miles from the summit of Rakhmat, the other islands of the bay all lie on the shore bank westward of Rakhmat island. East island, 203 feet high, and its highest point bearing W. $\frac{3}{4}$ S. $3\frac{3}{4}$ miles from the summit of Rakhmat island, has shoal water of 3 fathoms extending half a mile northward from it; but, on its north-western side, there are $3\frac{1}{2}$ fathoms within $1\frac{1}{2}$ cables of the beach. At 6 cables eastward of East island is the western point of another island, unnamed, but which is $1\frac{3}{4}$ miles in length, has several small peaks over 100 feet in height, and is

connected by a sand-bank, dry at low water, with Rakhmat. This island fronts the shallow entrance to a lagoon extending about 7 miles inland south-eastward, and having in it from $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water. Half a mile nearly from the northern shore of this island are two rocky islets, 156 and 153 feet high, and distant 3 and 6 cables respectively from the little islet first mentioned.

Anchorage.—There is good anchorage in the bay westward of Rakhmat island anywhere in line between that and Bird island, in from $3\frac{1}{2}$ to 5 fathoms. Southward and south-westward of Bird island, or south-eastward of Williamson island, the anchorage is in $3\frac{1}{2}$ or 4 fathoms; these anchorages afford good protection during southerly or south-easterly winds. For shelter against north-westerly winds, there is anchorage in a bight of the coast reef south-eastward of Rakhmat island in 4 or 5 fathoms. In approaching this latter anchorage keep the island on board, in order to avoid a projecting part of the shore reef south-eastward of it; there are 4 fathoms water within $1\frac{1}{2}$ cables of the south-eastern point of the island all round until it is on a north-easterly bearing. Westward of that position the water shoals rapidly to $2\frac{1}{2}$ and $1\frac{1}{2}$ fathoms.

Water.—In the bay westward of Ras Rakhmat and southward of East island, there are two wells; the nearest is brackish, the other better; a moderate supply may be obtained. There is neither village nor huts near the wells.

The Coast from Rakhmat island trends in a S.S.E. direction 29 miles to lat. $13^{\circ} 13' N.$; it then turns to E.S.E. for about 6 miles, and then N.E. by E. for 4 miles to Ras Beilul, the bight thus formed being Beilul bay. The first portion of this coast is low, sandy, and fronted by a coral reef varying in width from a few yards to 7 or 8 cables. From the beach, a flat desert extends a considerable distance inland; the only rising ground anywhere near the shore, visible to a passing vessel, are the Black hills, 110 feet high, in lat. $13^{\circ} 27\frac{1}{2}' N.$

RAS BEILUL, in lat. $13^{\circ} 14' N.$, long. $42^{\circ} 33' E.$, is 33 miles S.E. by S. from Rakhmat island. The depths between these two points are very regular, gradually increasing from the coast reef seaward. Sayal island, described at page 83, with other off-lying islands lying in the track of steam-vessels, bears N. by E. 6 miles from the extreme north-eastern point. Ras Beilul is a prominent point terminating north-eastward in the cape 100 feet high. At one mile W. by S. $\frac{1}{2}$ S. from the cape is a conspicuous hill 317 feet in height sloping away to the south-westward and fronting Beilul bay; it forms the north-western head and highest part of the Beilul promontory. At $3\frac{1}{4}$ miles S.W. $\frac{1}{4}$ W. from the summit of this hill is a large white sand drift on the side of the range facing the bay; it marks the head of the bay and is an excellent landmark by night or day.

See plan, No. 923.

Shoal water of 3 fathoms extends about 3 cables north-eastward of Ras Beilul, deepening quickly to 7, 9, and 15 fathoms.

BEILUL BAY is easily recognized when approached from the northward by the remarkable white sand-patch described above; the centre of this patch bearing S. $\frac{1}{2}$ E. is a good leading mark into the bay. At $1\frac{1}{4}$ miles westward of this sand drift, the hills rise to a height of 585 feet within three quarters of a mile of the shore; westward of these hills are lower black lava hills, followed by a flat clayey plain in the western part of the bay.

Shoals.—The head of the bay is upwards of 7 miles wide east and west. At $2\frac{1}{2}$ miles S.W. $\frac{1}{2}$ W. from the inner part of the cape is White island, a small islet 44 feet high, on the edge of the shoal extending from the coast, and having between it and the shore only from 5 feet to 2 fathoms water. There is also a bank of $2\frac{1}{2}$ fathoms, having 8 and 9 fathoms close to its northern edge, which lies $1\frac{1}{2}$ miles W. by N. from White island; the bank extends 4 cables towards the shore and nears it to 3 cables. This shoal was first discovered by the Italian iron-clad *Castelfidardo* striking on it when seeking an anchorage.

Another large bank lies in the middle of the bay with its northern extreme bearing W.N.W. from the high inner point of the cape, and distant from it 5 miles. From its northern end, this shoal extends southward 2 miles, with an average width of one mile, and has a depth of from one to $2\frac{1}{2}$ fathoms; off the northern part of its eastern side, and 4 or 5 cables distant, are two patches of 3 and $2\frac{1}{4}$ fathoms; off its southern edge at about the same distance, are two similar patches of $2\frac{1}{4}$ and $1\frac{1}{2}$ fathoms. These off-lying patches reduce the width of the channel between the shoal and the mainland to about 9 cables. The soundings inside the bank are from 7 to 9 fathoms, mud; on its western side, from 8 to 11 fathoms; and on its eastern side, 11 and 12 fathoms. In the outer part of the bay, there are from 20 to 16 and 14 fathoms, decreasing very gradually towards the shore.

There are some irregular soundings on the western side of the bay, W. by N. about 9 miles from Ras Beilul; here, shoal patches of 3 and $3\frac{1}{2}$ fathoms lie $1\frac{1}{4}$ miles from the shore; one mile north-eastward of them, and $1\frac{3}{4}$ miles from the shore, is a $4\frac{3}{4}$ -fathoms patch.

Anchorage.—Beilul bay affords excellent protection from the strong south-easterly winds so frequently experienced in winter, but is quite open and exposed to those from the northward. The best anchorage is in about 8 fathoms, with the high inner summit of Ras Beilul bearing E. by N. $\frac{1}{2}$ N. $1\frac{1}{4}$ miles, and White island S.W. $\frac{1}{2}$ S. about the same distance. Dhows anchor in a small bay W. $\frac{1}{4}$ N. $8\frac{1}{2}$ miles from the northern extreme of Ras Beilul.

There is neither town nor village near the beach in Beilul bay. The village of Beilul is 7 miles inland from the eastern side of the bay and communicates by road with the Italian settlement at Asab.

Beilul bay abounds with excellent fish. Firewood suitable for steaming purposes may probably be found close to the shore.

Sayal island.—See Chap. II., page 83, for the description of this island, and in the preceding pages of that chapter for the other islands lying in the track of steam-vessels proceeding up or down the Red sea.

MOUNTAINS.—**Barn hill and Chimney peak.**—Twenty-six miles westward of Ras Beilul, on a range of mountains, are two remarkable heights near each other, called respectively Barn hill and Chimney peak, from their supposed resemblance to those objects.

Asab hill, in lat. $12^{\circ} 57' N.$, long. $42^{\circ} 26' E.$, and bearing S.S.W. 18 miles from Ras Beilul, is 3,211 feet high, and is the highest in that neighbourhood; from it, a range with well-defined and conspicuous peaks extends eastward towards Sanah-bor and Asab; it is also connected with the high land round Beilul bay.

Coast.—From Ras Beilul south-eastward, until abreast of Sanah-bor island, the shore is low and skirted by a reef extending seaward upwards of a mile; the soundings decrease with regularity as the reef or shore is approached as far as that island. From thence the coast consists of a succession of sandy beaches with low rocky coast between.

Sanah-Bor, in lat. $13^{\circ} 5' N.$, long. $42^{\circ} 42' E.$, is a small round island 277 feet high, 13 miles S.E. $\frac{1}{4}$ S. from Ras Beilul and $1\frac{1}{4}$ miles N. by E. from Ras Dugai, which latter is only 2 miles N.W. by W. $\frac{1}{2}$ W. from Ras Luma, the western point of entrance to Asab bay. The island is surrounded by a coral reef, extending half a mile on its northern side and nearly a mile to the southward, and leaving a narrow channel with from $6\frac{1}{2}$ to 7 fathoms between it and the shore.

Jebel el Takhi, 983 feet high, is of conical form, standing well forward, and situated about $4\frac{1}{2}$ miles W.S.W. from the summit of Sanah-bor island.

SHOALS.—At one mile S.S.E. from Sanah-bor and 5 cables from the shore, there is a small isolated patch of $1\frac{1}{2}$ fathoms.

Two dangerous shoals, the Bosanquet and Fieramosca, lie off the northern and principal entrance to Asab bay; and another, the Scilla shoal or ridge, off the Rubattino or eastern channel into the bay. Before proceeding to a description of Asab bay, these outlying shoals demand attention.

Bosanquet shoal, not marked by discoloured water, is a small patch of coarse sand and broken shells, of $3\frac{1}{2}$ fathoms, about 3 cables in extent. On its eastern side, the depth increases quickly to 11 fathoms, and

See plan of Asab bay on chart, No. 8e.

there are from 8 to 9 fathoms close to all round it. From the shoal, the summit of Sanah-bor island bears W. $\frac{1}{4}$ S. $4\frac{1}{4}$ miles; the western extreme of Jezirat Fatma S.E. by S.; and, the small saddle or Saddle mount, S.W. $\frac{3}{4}$ W. The shoal thus lies off the very centre of the entrance to Asab bay.

Fieramosca shoal, between 4 and 5 miles northward of Jezirat Fatma, the island forming the eastern side of the main entrance of Asab bay, is a circular patch of coral about 9 cables in diameter, with a least depth of 15 feet, near its north-eastern edge, and with from $2\frac{3}{4}$ to $3\frac{3}{4}$ fathoms on the remainder of the shoal; within a short distance on all sides are from 12 to 15 fathoms. From the shoalest spot of 15 feet, Ras Fatma bears S. by E. $\frac{1}{2}$ E. 5 miles; Sanah-bor islet W. by S. $\frac{1}{4}$ S. $7\frac{1}{2}$ miles; and the Bosanquet shoal S.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles.

Buoy.—A red conical buoy is usually moored on the shoal patch on the north-eastern part of the Fieramosca shoal; its being in position should not be depended on, as it is liable to break adrift.

Scilla shoals.—The northern end of these shoals bears North $4\frac{1}{2}$ miles from Ras Makaua, from thence they extend south-eastward 6 miles forming a ridge of sand and coral with heads of only $2\frac{3}{4}$ and 3 fathoms and depths between of 4 and 5 fathoms. They front the Rubattino entrance to Asab bay, and in hazy weather should not be approached from seaward within a depth of 20 fathoms. A 3-fathoms patch at the south-eastern end of the shoals bears E. by N. $\frac{1}{4}$ N. about 4 miles from Ras Makaua beacon, and from the centre of this patch Raheita bluff bears S. by E. $\frac{1}{4}$ E.

The current runs strongly in the vicinity of the Scilla shoals and generally parallel with the line of the ridge, but at certain times there is an inclination towards them, to which the attention of the mariner is drawn.

Ras Makaua may be safely approached from the eastward between the bearings of N. 80° W. and West, and from the northward with the beacon bearing S. $\frac{1}{2}$ E.

A dangerous bank of sand and shells lies near the edge of the shore reef on the southern side of the Rubattino entrance, with as little as 6 feet water, about half a cable long and a quarter of a cable wide; from it, Ras Makaua beacon bears W. by S. $1\frac{1}{3}$ miles; its position is reported not to be marked by any discolouration of water, and the current in the vicinity has been observed to run at the rate of 4 knots during strong south-easterly winds.

ASAB BAY, between Ras Luma on the West and the islands extending north westward from Ras Sintiyān, a low sandy and swampy cape, on the East, is about 16 miles long, and upwards of 5 miles in

width ; it affords excellent anchorage and shelter from all winds. Besides the two large islands Haleb and Jezirat Fatma, which, with other smaller ones, form the eastern side of the bay, many small low islands lie within the entrance and in the middle of the bay, with short channels between them from 5 to 10 cables wide. These islands effectually shut out all swell from the bay, though during the North-east monsoon when strong south-easterly winds always prevail in the day, there is generally enough sea to be inconvenient for boats.

Nearly the whole of Asab bay is skirted by a reef which, towards the head, extends nearly 3 miles from the shore ; on it, and near its edge, are six small islands, mere sand cays, covered for the most part with cactus and other rank vegetation, and destitute of fresh water. All round the margin of the inner part of the bay, the ground is low, swampy, and muddy, high tides inundating the low grounds.

Asab.—The Italian settlement of Asab is about $1\frac{1}{2}$ miles within Ras Luma on the western side of Asab bay ; territory on the mainland together with most of the islands in the bay having been acquired by the Italians from the sultan of Raheita, whose residence is at Mergabela, 7 miles farther up the bay. There are a few European built houses and a native town of huts, but the colony is small ; no coals can be obtained, nor fresh provisions in any quantity, nor are there any means for effecting repairs to shipping. Postal communication is maintained by an Italian despatch boat. Asab is also in telegraphic communication by submarine cable with Perim and Massawa.

LIGHTS.—On Ras Buja, at the settlement, is exhibited, at 48 feet above the sea, from the north-east angle of the hospital building, a *fixed white* light visible seaward at a distance of 9 miles in clear weather between the bearings (approximately) N. 18° E. and S. 22° E.

A *fixed red* light is shown from the outer extreme of the mole.

The mole is about 104 yards long and affords good shelter to native-craft loading or discharging, or to boats landing ; it is a short distance southward of the lighthouse. An obelisk of dark stone erected at the back of the town is a conspicuous object from the sea.

A **buoy**, painted red, is moored in $5\frac{1}{2}$ fathoms water, about $2\frac{1}{2}$ cables S. by E. $\frac{1}{4}$ E. from the flagstaff.

Water.—A distilling apparatus has been established for the supply of the colony with water, but wells have now been sunk about three-quarters of a mile from Ras Buja which give a good and constant supply throughout the year. There is also a small stream, which may sometimes be dry, running into the bay a mile southward of the flagstaff ; and, at Mergabela, a good and plentiful supply can always be obtained.

See plan of Asab bay on chart, No. 8c.

The water on the islands is brackish and scarce; firewood is procured on them.

Jezirat Fatma, at the eastern side of the main entrance to Asab bay, is $5\frac{1}{4}$ miles eastward from the nearest part of the western shore between Ras Luma and the lighthouse; it is a low island of horse-shoe shape, 5 miles long round its convex side from end to end, covered with wood, and standing on a reef which has a total length of $7\frac{1}{2}$ miles in a N.W. by W. and S.E. by E. direction. From the north-western part of the island, this reef extends three-quarters of a mile with from $1\frac{1}{2}$ to $2\frac{3}{4}$ fathoms, and from its southern end, it extends E.S.E. $4\frac{1}{2}$ miles. The extreme width of the reef is $2\frac{1}{2}$ miles, narrowing to $1\frac{1}{4}$ miles near its south-eastern end, 7 cables within which is the small island of Dercos or Dhi-l-kaus. The southern part of this island and shoal form the northern and western side of the Rubattino channel into Asab bay.

Haleb island, its south-eastern end lying $1\frac{1}{2}$ miles south-westward of Ras Sintian, extends from thence, including Huiheb islet at its north-western end, $8\frac{1}{4}$ miles N.N.W. $\frac{3}{4}$ W.; its extreme width is $3\frac{1}{2}$ miles. It is very low, partly covered with jungle, and encircled by a reef. Its south-western side is the eastern boundary of Asab bay, and its north-eastern side forms the south-western side of the Rubattino channel.

Ras Makaua.—Beacon.—From Ras Sintian, the coast reef takes a northerly direction for nearly $4\frac{1}{2}$ miles, and then, curving in a south-easterly direction for 11 or 12 miles, encloses a shoal space nearly 4 miles wide, on the western and northern sides of which are several small islands. The northernmost of these, a low, narrow, woody island, is Makaua; its western end is only $2\frac{1}{2}$ cables separated from Haleb island, from thence it extends nearly $1\frac{1}{4}$ miles in a N.E. by E. direction to Ras Makaua, its eastern extreme, on which is a stone beacon, not very conspicuous from seaward. The reef extends northward between 2 and 3 cables from the northern side of Makaua island and forms the southern side of the Rubattino channel.

Entrances.—Northern entrance.—The width of this entrance between Asab and Jezirat Fatma, is 5 miles, and the depths, when inside the Bosanquet shoal, are very regular, from 9 to 12 fathoms; but, half a mile within a line connecting Ras Luma with the northern side of Fatma, a large shoal or middle ground of from $1\frac{1}{2}$ to $3\frac{3}{4}$ fathoms occupies the central space; on its inner part are the two islets Umm-el-Sciara and Heri. This mass of shoals is $2\frac{1}{2}$ miles long north and south by $1\frac{3}{4}$ miles wide; they leave a channel $1\frac{1}{2}$ miles wide between them and Fatma, and 2 miles wide between them and the Asab shore; the latter is the best and clearest channel by which to enter the bay.

Eastern entrance, or Rubattino channel.—This entrance, between Ras Makaua and Dercos island, commences on a W.S.W. course and turns to W.N.W.; it is 7 cables wide between the shoals on either side, and has a least depth of 4 fathoms in the best water in the channel, with from 6 to 9 fathoms elsewhere; but it has central shoals of $1\frac{1}{2}$ and $1\frac{1}{4}$ fathoms, rendering the passage very intricate and winding. Leading beacons have been erected on a small islet between Huiheb and Haleb islands, as well as the beacon on Ras Makaua, to assist in its navigation; the leading beacons in line lead through in 3 fathoms, but, considering its intricacy, as well as the dangerous nature of the shoals off its entrance, previously described, this channel should not be attempted by any but those thoroughly acquainted with it.

Directions.—The best channel into Asab bay, as has been stated, is that westward of the shoal or middle ground between Asab and Jezirat Fatma. If proceeding beyond Buja road, steer through this channel and from thence to the southward through the Mergabela channel, passing eastward of Hodunlai and Umm-al-Baher, two small sandy islands surrounded by a reef, which lie from 3 to 5 miles southward of Ras Luma, and passing westward of Gurda, Darmakia, and the other islands. The depths through this channel are from 9 to 7 fathoms, gradually decreasing to $5\frac{1}{2}$ fathoms at the anchorage one mile from the shore off Mergabela. The entrance by the eastern or Rubattino channel can be best understood by consulting the chart and the preceding description.

Tides.—It is high water, full and change, at Ras Makaua at about 0 h. 20 m.; the rise of tide is about $2\frac{1}{2}$ feet.

Anchorage, with good shelter from all winds, may be found southward of the islands in Asab bay in a space 6 miles east and west, by 3 miles in width, in from 6 to 7 fathoms, mud; there is also good anchorage close to the Italian settlement in 7 fathoms, with the flagstaff bearing N.W.; and from that position southward, in Buja road, in about the same depth.

DUMEIRA ISLAND, 260 feet high and 15 miles south-eastward of Ras Sintian, is about three-quarters of a mile long and rises to its greatest height in Jebel Dumeira, a remarkable and sharp double peak in its centre. The island is separated from Ras Dumeira by a narrow 5-fathoms channel; there is a small rocky island outside and nearly joining it, and a small rocky shoal, with a least depth of 2 fathoms, lies about a mile northward of it.

In southerly winds anchorage may be taken off the west point of Dumeira island, in from 5 to 10 fathoms, sandy bottom.

Ras Dumeira, the point near the island of this name, is a rocky bluff presenting at a distance an aspect similar to that of the island, and surmounted like it by two or three summits, one of which is flat. A low

See plan of Asab bay on chart, No. 8c.

sandy plain extends westward from Ras Dumeira up to the mountains of the interior; to the northward there is a sandy shore, and a small harbour where boats can land at all seasons; south of Ras Dumeira the shore is bordered by a reef which renders landing difficult.

The north frontier of the French Protectorate follows the crest of the bluff and is indicated by two boundary land marks, one erected upon the Ras and the other upon Dumeira island.

Raheita bluff, 266 feet high and 2 miles north-west of Ras Dumeira, is remarkable from its black appearance and white sand drift on its northern slope. About 2 miles north-westward of the bluff, and a mile inland, is the village of Raheita, consisting of about 70 well-built huts, with a population of about 300. There are also a few straggling villages in the vicinity. Excellent water can be obtained close to the village, and brackish water in the wells. Bullocks and sheep may be purchased.

Both Dumeira island and Raheita bluff generally show out well in hazy weather. There are good boat anchorages between Ras Dumeira and the bluff; but there is no good anchorage for vessels in this vicinity during strong southerly winds, except that just mentioned near the west point of Dumeira island.

Appearance of the land.—Jebel Ma-sab, or Small Saddle, 898 feet high, is dark and very conspicuous; it is 3 miles southward of Ras Luma, the western point of entrance to Asab bay. High Saddle is about 10 miles in a direction nearly West from the Small Saddle, and resembles it in some views, but is much more towering, being 2,275 feet high and forming part of the higher range described at page 224, which, commencing with the Small Saddle, increases in height westward until it culminates in Asab hill, 3,211 feet high, and 14 miles westward of the Small Saddle. First and Small peaks are two remarkable hills or pyramids between the Small and High saddles.

Jebel Abu-Lulu is a small piece of table-land 1,096 feet high, in the near range of hills, about 14 miles W. by S. $\frac{1}{2}$ S. of Dumeira island. Beach hummock (840 feet) is the larger of two conical hills south-westward of Asab bay. In the same direction, and in about lat. $12^{\circ} 35' N.$, long. $42^{\circ} 27' E.$, is Potosi mountain, a conspicuous double-gapped peak 5,000 feet high and very steep, a useful mark in navigating the southern part of the Red sea.

Jebel Hadáleh, 1,662 feet high, is a remarkable lump on the nearest range of hills, 18 miles W. by N. from Jebel Siyan.

The general appearance of the land between Ras Beilul and Ras Siyan is high, rugged, and mountainous towards the interior, quite barren, and decreasing in several successively lower ranges towards the coast; in the neighbourhood of Ras Sintiyán, the hills appear as broken table land, and Jebel Abu-Lulu is one of the most conspicuous of these. Farther southward commences a broken mountainous mass of cones having very steep sides

and fantastic shapes. Of these the most remarkable is Jebel Hadáleh, just described. Some of the hills have a covering of coarse, granular, black, and lightish-brown earth, intermixed with ironstone, which on Ras Beilui is said to have considerable effect upon the magnetic needle.

From Ras Dumeira to Ras Siyan the coast is formed by a low sandy plain, extending as far as the mountains of the interior, the crest of which composed of a great number of peaks and crenallated summits is situated 10 to 14 miles inland. Vegetation commences about $1\frac{1}{2}$ miles from the shore, thickening more and more towards the interior and also to the south. In the vicinity of Ras Siyan are bushes of considerable extent, where the natives of Perim and the Arabian coast come for wood.

RAS SIYAN, the south-western point of the strait of Bab-el-Mandeb, is a gloomy-looking volcanic peak of reddish colour 442 feet high, projecting northward from the coast, with which it is connected by a neck of low land 650 yards wide. The northern face of the cape is rocky and precipitous; on its western side is a swampy bay surrounded by mangrove bushes, which is obstructed by coral banks and affords no anchorage. Eastward of the cape, a bank runs out about a mile, having 5 or 6 fathoms on its outer edge.

About $1\frac{1}{2}$ miles N.W. by N. from Ras Siyan and from half a mile to a mile from the nearest part of the shore are two small rocks 7 feet above water. There are 20 fathoms close to on their eastern side, and an irregular channel between them and the mainland.

Anchorage.—During southerly winds anchorage may be found northward of Ras Siyan (clear of the two small rocks just described) in 8 to 10 fathoms, sand, but the shelter is not good and the tidal currents run strong. There is landing in two small circular coves on the north side of the cape.

STRAITS of BAB-EL-MANDEB. — Depths. — Between Ras Siyan and cape Bab-el-Mandeb, the strait is 14 miles wide; near the latter is the small island of Perim, which divides the strait into two. For large ships, the navigable width of the north-eastern or Small strait is rather less than $1\frac{1}{2}$ miles at its narrowest part, between Obstruction point and Oyster island reef, and has from 8 to 16 fathoms water. As it opens out into the Red sea, the water becomes shallower, and at $1\frac{1}{2}$ miles westward of Ras Sheikh Syed and nearly 2 miles N. $\frac{1}{2}$ W. from Obstruction point lighthouse are two considerable patches with only 5 fathoms; whilst for a distance of $1\frac{1}{2}$ miles in the direction of the fairway through the strait and for a width of 5 or 6 cables, hereabout, the depth is generally only from $5\frac{1}{2}$ to $6\frac{1}{2}$ fathoms. Southward of the strait the water quickly deepens to over 20 fathoms.

See chart, No. 8e, with plan of straits.

The Large strait, between the south-western side of Perim and the African shore, is about 9 miles wide, and is a perfectly safe channel, there being deep water right across, and in the middle of the strait, in the direction of Ras Siyan, the depths are from 100 to 185 fathoms; farther northward they are somewhat less. On the Perim side, a bank extends 3 miles off the island, with from 40 to 60 fathoms on its outer edge, gradually shoaling to 20 fathoms close to the island. This bank is connected with the Arabian coast bank and deepens very suddenly to 150 and 180 fathoms in mid-channel. The Large strait is narrowed in its southern entrance by the Jezirat Sowabih or Brothers islets, described at page 236, the highest and north-eastern islet being 9 miles S. $\frac{1}{2}$ W. from the southern point of Perim island.

The Small strait is most commonly used both by steam and sailing vessels; with the former, the chief advantage is the shorter and more direct route; with the latter, the option of anchoring afforded in any part of the strait in the event of the wind falling light.

DIRECTIONS.—Large strait.—This passage, though perfectly clear of danger, is seldom used by steamers for the reason just named, but as both extremes of Perim are now lighted, a stranger might possibly prefer this passage to the other on a dark night. A sailing vessel using it, with a strong favourable wind, should keep well over on the Perim side, as, in the event of the wind dying away, she may anchor and thus escape being set upon the Brothers, should the current be setting to the southward. If too far off Perim to anchor, the only chance of bringing up in this channel is near Ras Siyan, or at the north-western islet of the Brothers.

Small strait.*—A steam vessel, or sailing vessel with a fair wind, intending to pass through the Small strait, should avoid the shallowest water westward of Ras Sheikh Syed by approaching Perim high light on a S. by E. or S. $\frac{1}{2}$ E. bearing, taking care to keep within the arc of visibility of Obstruction point light, in order to clear the shoal ground extending from the northern shore of Perim. When about 2 miles from the high light, she should bring Obstruction point light on the starboard bow, and, steering about S.E. pass from 4 to 6 cables clear of that point. A vessel should keep rather nearest to the Perim shore in passing through the narrows when coming from the northward, as Oyster islet is low and difficult to distinguish, as it shuts in with the higher land behind it. When approached from the south-eastward, Oyster islet shows out well against the horizon, and can be kept in view until nearly abreast of it. Azalea point, the south-eastern extreme of Perim, is foul to a distance of 2 cables.

* An old sunken wreck, which is still a danger to vessels of moderate draught, lies in 6 fathoms in the small strait, with Obstruction point lighthouse (in line with summit (50 feet) of the next point north-westward) S. 45° E., distant 2 miles, and Signal hill l flagstaff S. 27° W.

See chart, No. 8e, and plan, No. 2.592.

During the strong southerly gales which blow in the southern part of the Red sea during the months of December, January, and February, sailing vessels should never attempt to work down to the strait, but should wait for a lull, and then work with the tides, day and night, anchoring close inshore during the flood; *see* tides, page 235.

Approaching the strait from the eastward, a small peak is first seen 25 or 30 miles distant, others gradually rise above the horizon and become united; this is the land about Ras Bab-el-Mandeb. When 15 or 20 miles distant, Perim with its high lighthouse will be seen from the deck, southward of the peak first seen; its outline is even and unbroken, and cannot be mistaken for the high land of Bab-el-Mandeb, which has many irregularities.

Sailing vessels entering the strait from the eastward during north-westerly winds should work off and on the Arabian coast, keeping in soundings and anchoring on the ebb if found too strong to work over. At night, the soundings are a good guide; and a vessel working between 15 and 35 fathoms could not miss the Small strait, the edge of the bank off-shore being very precipitous.

In the months of June, July, and August, thick hazy weather is often experienced on the Arabian coast between Aden and the strait. If the wind is north-westerly, fresh gusts may be expected, especially when near the shore, and sometimes the wind changes quite suddenly and blows fresh from the southward. During these months, therefore, it is necessary for a sailing vessel to have good sails bent, and also to observe the caution just given as to keeping within anchorage depths. On the African shore, the gusts are also violent at times. The only dangers to be avoided are the reefs off Zeila on that side, and those between Ras al Ará and Ras Kaáu on the Arabian shore; towards these latter, a vessel should not stand into less than 20 fathoms by night or 15 fathoms by day, the water shoaling suddenly. By daylight, the edge of the reef is generally visible.

PERIM ISLAND, is a British possession; it is a bare rocky island, rather flat in appearance, about $3\frac{1}{2}$ miles long and $1\frac{1}{2}$ miles wide; its highest point (on which is Lloyd's signal station, near the south-eastern end), being 214 feet high. Near the western end is Signal hill, 112 feet high, on which is another signal station. The surface of the island is grooved with watercourses, and covered with coarse grass and stunted shrubs, the subsoil being sand and conglomerate coral. It has a good harbour and convenient coaling station on its south-western side. Shoal water of 16 feet and less extends half a mile seaward from Ras Sheikh Berklud on the northern side of the island, with 4 fathoms on its outer edge; and, nearly 2 cables off Azalea point, the south-eastern point of the island, is a rock having 2 fathoms least water, with 4 and 5 fathoms close to; from the rock, Perim high lighthouse bears N.W. $\frac{3}{4}$ N.

See chart, No. 8c, with plan of straits.

Perim, for many years a place of little or no value, and its only inhabitants a small detachment of Indian troops, has of late years become of much greater importance from its excellent position as the coaling station of the Perim coal company, by whom the harbour is lighted and buoyed, as well as its being a station of the Eastern Telegraph Company and for Lloyd's signals. The population now amounts to about 700; at times the coal company's employés may increase this number by 150. No one is allowed to reside on the island without the permission of the Resident.

Telegraph cables.—Perim is in telegraphic communication by cable with Aden, Suez, Obokh, Asab, Massawa, and Sawákin; the rates are the same as at Aden.

LIGHTS.—On the eastern and highest part of Perim, half a mile south-westward of Obstruction point, stands the high lighthouse, 38 feet high and exhibiting at 249 feet above the sea, a *revolving white* light every minute, visible in clear weather at a distance of 22 miles. The eclipses are not total within a distance of 15 miles. The lighthouse is a gray stone tower with a white lantern, and with its offices, barracks, &c., is enclosed by a loop-holed wall.

Obstruction point.—At 30 feet from the edge of the cliff on Obstruction point, from an octagonal gray lighthouse 30 feet high from base to vane, and at an elevation of 85 feet above the sea, is exhibited a *group-occulting white* light with a period of *ten seconds*, thus:—light, seven seconds; eclipse, one second; light, one second; eclipse, one second. The light is visible in clear weather at a distance of 14 miles between the bearings S.S.E. $\frac{1}{2}$ E., through south and west, and N.W. $\frac{1}{4}$ N.

Balfe point.—On this point, the western extreme of Perim island, is a conical white lighthouse 28 feet high, from which is exhibited, at 46 feet above the sea, a *fixed white* light visible 5 miles between the bearings S. by W. $\frac{1}{4}$ W. through east to N. by W. $\frac{1}{4}$ W.

Perim harbour, on the south-western side of the island, is divided into two branches by Murray point, on which are two white beacons which serve as leading marks into the harbour by day, and on which the leading lights are exhibited by night. The main branch extends N.W. by W. one mile; the other N.N.E. about 7 cables.

Entrance.—Depths.—The entrance between Pirie point on the north-west and Lee point on the south-east, bearing from each other N.W. $\frac{3}{4}$ W. and S.E. $\frac{3}{4}$ E., is $4\frac{1}{2}$ cables wide, and has from $4\frac{1}{2}$ to 9 fathoms water, extending to within a cable of either side. The north-eastern arm is obstructed by shoals; the north-western arm has more available space and forms the port, but for half its length, towards the head, it decreases in depth from 4 fathoms to $1\frac{1}{2}$ fathoms and then to a few feet only. Anchorage

may be obtained in it in 5 or 6 fathoms, sand and coral bottom, with plenty of room for a ship to swing and in close proximity to the coal stores.

Myrmidon shoal, rather interferes with the anchorage of ships of large draught in Perim harbour. On the north-west portion of this shoal there is a least depth of 25 feet, and on the south-east portion of 24 feet, at low water, bottom sand. It is 8 cables in length, north-west and south-east, and 2 to 3 cables across; from its north-west extreme, taking 5 fathoms as the limit, Pirie point lighthouse bears South $3\frac{2}{10}$ cables, and Coal-stacks pier extremity, W. $\frac{5}{8}$ N.

Harbour lights.—In addition to the principal lights of Perim island already described, the following lights are exhibited for the guidance of vessels entering the harbour :—

Murray point.—Two *fixed white* lights on the beacons on this point, visible at the distance of 3 miles. They are respectively 34 and 44 feet above the sea, and 100 yards apart; when in line bearing N. by W. $\frac{1}{3}$ W. they lead into the harbour.

Pirie point.—A *fixed red* light, visible 3 miles, 44 feet above the sea.

Gas buoys.—One off Pirie point, another just within Lee point, bearing from each other N.W. by W. $\frac{5}{8}$ W. and S.E. by E. $\frac{5}{8}$ E. $3\frac{1}{2}$ cables; both show *fixed white* lights. These buoys are painted red and white.

Two *fixed white* lights are also shown *vertically* from the coal company's wharf.

Buoys.—In addition to the two gas buoys at the entrance of the harbour, already described, four can buoys also painted red with white tops, are placed to mark shoals in the harbour, which must all be left on the starboard hand when entering, viz. :—On the south side of the East end of the Nimble shoal of $2\frac{1}{4}$ fathoms; on the south point of a shoal of $2\frac{1}{4}$ fathoms lying about 2 cables west of Nimble shoal; on the south-east side of a $2\frac{3}{4}$ -fathoms extension of the shore reef, which projects one cable south-westward from Murray point; and at three-quarters of a cable south-westward of Nevis point. Four red mooring buoys are placed on the southern side of the harbour, off the piers. There are two cairn beacons on Lee point.

Coal and Supplies.—Welsh coal can be obtained from the stores of the Perim Coal Company and put on board at the maximum rate of 50 to 120 tons per hour. A stock of 8,000 to 10,000 tons is usually kept. There is no liability to interruption of coaling from bad weather. Provisions, stores, ice, and water may be procured; the latter obtained by means of condensers; water is sent alongside in boats, and pumped into the ship at the rate of 40 tons an hour. The services of an extensive

salvage plant, and of European divers can be had at this place, and considerable repairs to ship and machinery can be effected.

Turtle may be caught on the shores of the harbour during the season of the year when the females land to lay their eggs.

Pilots.—By hoisting the usual pilot flag by day, or burning a blue light at night, as soon as Perim high light is well in sight, the attendance of a pilot well outside the harbour is assured; corresponding signals, in answer, are made from the shore.

Directions.—To enter Perim harbour, caution is necessary as the current occasionally sets across the entrance according to the direction of the wind. Bring the lights or beacons on Murray point in line N. by W. $\frac{1}{8}$ W. and steer for them, passing between the light-buoys off Pirie and Lee points; check the ship's way as she passes Pirie point, haul round into the North-west arm, with the flagstaff at the signal station in that arm bearing W.N.W., and anchor as convenient; or proceed to one of the mooring buoys as may be desired or as the harbour-master may direct.

Winds and Weather, &c.—See Appendix, page 481.

TIDES.—It is high water, full and change, at Perim and in the straits generally at 8 h.; springs rise $6\frac{1}{2}$ to $7\frac{3}{4}$ feet, neaps $5\frac{1}{2}$ to $6\frac{1}{4}$ feet. The flood sets N.W., and the ebb S.E. The streams are very irregular both in period and in velocity; sometimes in the centre of the strait there is very little ebb, while at other times, particularly at night, at full and change, it runs at the rate of 4 miles an hour, creating a strong ripple when opposed to the wind. In the channels, the tides greatly depend on the prevailing winds; after a fresh north-wester, the flood will run for 16 hours, and vice versa after a south-easter; the water at the same time ebbing and flowing on the beach with great regularity.

Currents and Tidal streams.—The surface set in the straits of Bab-el-Mandeb is the resultant of the tidal streams and the currents due to wind, and is very variable.

The tidal streams are about $1\frac{1}{2}$ knots at springs; the north-western stream making about 7 hours before superior high water at Aden, and running for 12 hours; for the other 12 hours the tidal stream runs to the south-eastward.

During the period of the strong south-easterly winds, viz., from November to April, the current induced by the wind often overcomes the south-east going stream, and there may be a constant set inwards varying from a quarter of a knot to $3\frac{1}{2}$ knots an hour.*

When the stream is running strong into the Red sea there is frequently an eddy to the south-east along the south shore of Perim island.

No observations have yet been obtained during the period of north-westerly winds.

From June to September while the south-west monsoon is blowing in the Indian ocean, the general result of the surface set is out of the Red sea, but during the north-east monsoon, from November to April, into the Red sea. In the straits of Bab-el-Mandeb the current has reached a total amount of 40 miles a day.

From observations made by H.M. surveying vessel *Stork* in January 1898, whilst at anchor in 118 fathoms 7 miles S.W. by W. from Perim island, it would appear that the resultant of the surface current was at that season into the Red sea at an average rate of $1\frac{1}{2}$ knots per hour; but that although the current was generally setting in, its rate was greatly accelerated, or retarded, by tidal influences. From about 8 hours before to 4 hours after the highest high water at Perim, the rate of the current inwards was from $1\frac{1}{2}$ knots to $2\frac{1}{2}$ knots; whilst from 4 hours after, to 8 hours before, the highest high water, the rate of the inward current was from 0 to $1\frac{1}{4}$ knots.

Under-currents.—From observations made for a period of four days, January 19th to 23rd, 1898, by H.M.S. *Stork*, with a view of ascertaining the difference in the set of the lower strata of the water at the entrance of the strait of Bab-el-Mandeb, with reference to that of the upper portion; the following broad result was arrived at:—

There was a permanent current on the surface setting into the Red sea of about $1\frac{1}{2}$ knots per hour.

There was at 105 fathoms depth a permanent current setting outwards of probably the same velocity.

The tidal stream was about $1\frac{1}{4}$ knots at its maximum and flowed for about 12 hours each way, as might be expected from the fact that in this locality there is practically only one tide in the day.

This tidal stream prevails to the bottom, with variations of strength. Somewhere about 75 fathoms is the dividing line between the two permanent currents, but it would require a longer series of observations to determine this point with any precision. Both are influenced by tide.

JEZIRAT SOWABIH, or the BROTHERS, are a group of six rocky islets, immediately outside the Large strait, extending $5\frac{1}{2}$ miles in an east and west direction; the highest or north-eastern islet bears E. by S. $5\frac{1}{2}$ miles from Ras Siyan, and 9 miles S. $\frac{3}{4}$ W. from the southern point of Perim island. The western islet is $2\frac{1}{4}$ miles from the shore, and the eastern islet 7 miles. The channels between them are safe, the depths varying from 6 to 25 fathoms. The tides are rapid and irregular.

The islets are of a brownish colour, the westernmost being volcanic.

See chart. No. 8e.

They are of considerable height, and five of the six may be seen in clear weather from a distance of 20 to 25 miles. The north-eastern islet is 350 feet high, the westernmost 200 feet, and the second from the westward 250 feet. The highest has a conspicuous peak, and on its northern side is a bay which forms an excellent boat-harbour protected from all winds except those between North and East; the bay is abundantly supplied with turtle and various kinds of fish. A low rocky islet to the westward is the only part that may be considered dangerous.

Anchorage may be taken to the southward of the large (N.E.) islet, opposite a small sandy stretch of shore, and near the N.W. Brother.

THE COAST.—The description of the African coast southward of Ras Siyan is continued in Chap. IX., page 354.

See chart, No. 8e.

No observations have yet been obtained during the period of north-westerly winds.

From June to September while the south-west monsoon is blowing in the Indian ocean, the general result of the surface set is out of the Red sea, but during the north-east monsoon, from November, to April, into the Red sea. In the straits of Bab-el-Mandeb the current has reached a total amount of 40 miles a day.

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Under-currents.—From observations made for a period of four days, January 19th to 23rd, 1898, by H.M.S. *Stork*, with a view of ascertaining the difference in the set of the lower strata of the water at the entrance of the strait of Bab-el-Mandeb, with reference to that of the upper portion; the following broad result was arrived at:—

There was a permanent current on the surface setting into the Red sea of about $1\frac{1}{2}$ knots per hour.

There was at 105 fathoms depth a permanent current setting outwards of probably the same velocity.

The tidal stream was about $1\frac{1}{4}$ knots at its maximum and flowed for about 12 hours each way, as might be expected from the fact that in this locality there is practically only one tide in the day.

This tidal stream prevails to the bottom, with variations of strength. Somewhere about 75 fathoms is the dividing line between the two permanent currents, but it would require a longer series of observations to determine this point with any precision. Both are influenced by tide.

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The islets are of a brownish colour, the westernmost being volcanic.

See chart. No. 8c.

They are of considerable height, and five of the six may be seen in clear weather from a distance of 20 to 25 miles. The north-eastern islet is 350 feet high, the westernmost 200 feet, and the second from the westward 250 feet. The highest has a conspicuous peak, and on its northern side is a bay which forms an excellent boat-harbour protected from all winds except those between North and East; the bay is abundantly supplied with turtle and various kinds of fish. A low rocky islet to the westward is the only part that may be considered dangerous.

Anchorage may be taken to the southward of the large (N.E.) islet, opposite a small sandy stretch of shore, and near the N.W. Brother.

THE COAST.—The description of the African coast southward of Ras Siyan is continued in Chap. IX., page 354.

See chart, No. 8e.

CHAPTER VI.

EAST COAST OF RED SEA FROM RAS MUHAMMED TO
JIDDA, INCLUDING THE GULF OF AKABA.

(Lat. 29° 30' N. to lat. 21° 20' N.)

 VARIATION IN 1900.

Ras Muhammed	-	3° 30' W.	Jidda	-	-	2° 55' W.
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GENERAL REMARKS.—Following the order of construction given on the first page of this work, and having in the preceding chapters completed the description of the western shores of the Red sea and strait of Bab-el-Mandeb, we now return to the northern end of the Red sea, and, starting from Ras Muhammed, proceed to describe the eastern coasts of that sea, the scope of the present chapter including the gulf of Akaba in the North and the port of Jidda in the South.

The eastern coast of the Red sea, which is entirely Arabian, but forming a part of the Turkish empire, is divided at about the parallel of 20° N. into the two provinces of Hedjaz, and Yemen, the former being the northern, the latter the southern province. The part now to be described, therefore, embraces almost the whole littoral of the province of Hedjaz, which province includes within it the sacred cities of Medina and Mecca, the former the burial place of Muhammed, the latter his birthplace.

Aspect.—From the gulf of Akaba to the strait of Bab-el-Mandeb, a distance of 1,000 miles, the Arabian mountains are conspicuous throughout, presenting peaked summits of naked rock from 5,000 to 8,000 feet in height, and varying from 12 to 60 miles in distance from the shore. This range falls so abruptly westward that it presents towards the sea a series of inaccessible cliffs; other, but lower, ranges approach the sea shore in some places, decreasing in height as they advance. In clear weather, these mountains are visible at from 40 to 70 miles, the most remarkable are mount Mowila, the Rudhwa mountains, and Jebel Subh; the others present but little variety.

The higher mountains exhibit formations of gneiss and porphyry in vertical strata, rising above hills of sandstone and gypseous rock. Many of the hills nearer the shore are of limestone, consisting almost entirely of

See chart, No. 2,523.

a mass of marine fossil remains; those bounding the seashore are of light-coloured sandstone, fronted by and containing large quantities of shells and masses of coral. The extraordinary prevalence of the latter in the Red sea, as was remarked in the first chapter, *see* page 2, is well known; (indeed, its coral reefs are probably as extensive as those found in any part of the world;) it also enters largely into the composition of some of the highest hills.

From the bases of these hills to the shore of the tract between Ras Muhammed and Jidda, there runs a border of lowland of irregular width, which the Arabs call Tehama. It is generally desert and barren; some few spots are cultivated, but they bear so trifling a proportion to the whole as to scarcely need notice. The coast line northward of Yenbo is of moderate height, varying from 50 to 100 feet, with no beach. Southward of that port it is more sandy and lower; the inlets and harbours of the former tract may be called coves; in the latter they are lagoons.

Farther southward, from Yenbo, to Jidda, the coast, consisting of sand-banks with coral bases, is lined with reefs, which run nearly parallel with the shore, with which they are in many places connected. It is very difficult, if not impossible, to distinguish the entrances to the inlets or *sherm*s in this district without the aid of a native pilot. To the natives they compensate in some degree for the deficiency of better anchorages, and they are so situated with respect to each other as to form convenient halting places for the boats and vessels in their progress up and down the sea. In some places there are none, and the Arabs are, under these circumstances, constrained to depend on the precarious shelter afforded by the reefs. The usefulness of these inlets, should small steam-vessels take the route inside the outlying reefs, is evident, and the facilities they afford for procuring fresh water, provisions, and firewood would in such a case be of importance.

The Reefs in this part of the sea are found either extending in ridges, which have generally deep water or no soundings near them, or they form extensive banks, with from 10 to 15 fathoms over them. With some few exceptions, their general direction is straight; though in many places the short projections on either side give them a serpentine appearance. Their length varies from 150 yards to 2 or 3 miles, which they rarely exceed; and it is important to remark that under no condition of wind or weather is a heavy surf to be seen on them; this is probably owing to the coral being more porous on the outer parts of the reefs, and also to its being of the branched variety, by which the force of the sea becomes much reduced.

Inner channel.—The passages inside the numerous reefs lying off the Arabian coast are but little used, except by small native vessels and boats; and, for the reasons given in the remarks on these channels at

See chart, No. 2,523.

page 70, there is no possibility of their being connected with any high ground except in the distance of 100 or 120 miles.

WINDS AND WEATHER IN THE BAY OF ADEN.—A general view of the winds usually encountered abounds on the western side of the Red Sea. The winds in every direction on the Arabian side, but the Indian sea combined in 1891. This year at Aden they experienced greater or less Arabian winds more frequently in June and July, and a strong wind in the western part of the bay, which blew from May to July, when they experienced Arabian winds, more or less, every summer and in January and February, and also towards the middle of March, April, May, and June, and of the present summer.

THE COAST.—The mountains are very high, and the coast is very high from the high end of the bay, which is the point of view of the sea. The coast is a very high and steep mountain range, which is the high end of the bay, on the western side. Immediately on the edge of the mountains is the sea and extends nearly to the peninsula; the general height of these mountains is 1000 feet, and during the winter months the summits are frequently covered with snow.

From the narrow neck described, near Ras Muhammed the gulf of Akaba, the coast is high and precipitous, but near the shore.

Sherm Sheikh and Sherm ul Moiya.—The two small harbours from Ras Muhammed are the two small harbours, Sherm ul Moiya, separated from each other by a rock 10 to 20 feet in height. The western, Sherm Sheikh, named from the tomb of a sheikh, at the eastern extremity is more capacious and has a wider entrance than the other, and is almost the tomb at about $1\frac{1}{2}$ cables from it, of about 14 fathoms, sand, but care must be exercised, the bank drops abruptly into deep water.

The narrow entrance to the completely sheltered Sherm ul Moiya is so obstructed by coral banks, that a ship 10 feet can only make its way through these obstructions, and there is no anchorage outside them. The Sherm ul Moiya containing but little water, and that is very shallow on the western side of the bay about 150 yards from

See chart, No. 757, and plan, No. 11.

Sinai. This port is formed by a line of coast nearly 2 miles, running westward; on the outer side among the trees, indifferent to the date grove is inhabited during the winter months before the winter months. Mountains in the dreary peninsula

the small harbour, is a perfectly good anchorage. Also, outside the good anchorage in about 8 fathoms, the bottom is sandy and uneven. A reef projects from the north-east end of the land-spit, which

is on the same side about 10 miles from the sandy point Ras Arser. A reef projects out to seaward, but there is no

may be obtained during northerly winds, from Ras Arser.

A temporary anchorage on the eastern side of the bay, by N. 10 miles from Wasit; it is 8 or 10 miles from the land which bounds the view on the east either in the northern or southern part of the bay. A sandy point in 5 or 6 fathoms, well exposed to the eastward in 12 fathoms at $1\frac{1}{2}$ miles from the shore. The depth increases rapidly to seaward. A reef projects from this point a little to seaward, and a little from the shore.

There is a large grove of palm trees and about 10 miles from the shore.

This spot affords a good anchorage in sand; indifferent to the water over them, there are some reefs. The anchorage is in the north of the bay, and can be seen at a distance to seaward.

There are some reefs above the anchorage, and from

page 29, there is no probability of their being frequented by steam-vessels to any appreciable extent in the absence of ports of trade requiring their use.

Winds and Weather in the Inner channel.—At page 116 is given a short outline of the winds usually experienced in the Inner channel on the western side of the Red sea. The winds and weather are very similar on the Arabian side; but the Indian surveying vessels remarked in 1830–1834 that although they experienced land and sea breezes on the Arabian shore more frequently in March and April than on the African side, the land squalls in the southern part of the sea occurred in April and May. From May to July, when they experienced them on the Nubian coast, there was thick hazy weather and heavy dews on the Arabian side opposite; see also remarks on winds, weather, rainfall, &c., in Chap. I., and at the end of the present chapter.

The COAST.—Ras Muhammed has been fully described at page 113. The land leading to the Ras from the high land of the peninsula of Sinai which separates the gulfs of Suez and Akaba, is a long narrow tract nearly divided from the peninsula about 5 miles from the Ras, by the deep bay of Ghazulani on the eastern side. Immediately northward of this, a range of mountains takes its rise and extends nearly the whole length of the peninsula; the general height of these mountains is from 3,000 to 5,000 feet, and during the winter months the summits of the highest are frequently covered with snow.

From the narrow neck described, near Ras Muhammed, to the entrance of the gulf of Akaba, the coast is high and precipitous, having no soundings near the shore.

Sherm Sheikh and Sherm ul Moiya.—About 8 miles northward from Ras Muhammed are the two small harbours, Sherm Sheikh and Sherm ul Moiya, separated from each other by a rocky tongue of land 50 to 70 feet in height. The western, Sherm Sheikh, which derives its name from the tomb of a sheikh, at the eastern extreme of the bay, is the more capacious and has a wider entrance than the other. It affords good anchorage abreast the tomb at about $1\frac{1}{2}$ cables from the shore, in a depth of about 14 fathoms, sand, but care must be exercised in taking a berth as the bank drops abruptly into deep water.

The narrow entrance to the completely sheltered inner basin of Sherm ul Moiya is so obstructed by coral banks, that a ship drawing more than 10 feet can only make its way through these obstacles with the greatest caution, and there is no anchorage outside them. There are wells in Sherm ul Moiya containing but little water, and that brackish; they are situated on the western side of the bay about 150 yards from the shore.

See chart, No. 757, and plan, No. 3,047.

From this place, Mount Sinai may be reached in $2\frac{1}{2}$ days by a comparatively good road.

In this locality, when it is blowing hard from N.N.W. out of the gulf of Suez and N.N.E. out of the gulf of Akaba, the winds meet, coming in gusts, and changing in a few seconds, from both quarters. Still, a sailing-vessel with perseverance, can get to an anchor by keeping well to windward, and then running along shore. From these harbours, the Bedouin Arabs of Tor are always on the look-out, eager and happy to convey letters or passengers from here to Suez or Cairo. They are civil and attentive, and may be freely trusted; in four days they take letters to Suez. Between Ras Muhammed and these harbours there is no anchorage on the coast; the mountains are close to the sea and present a grand range extending N.N.E. and N.N.W., from 3,000 to 5,000 feet high.

The GULF of AKABA, has a general N.N.E. direction for 98 miles, with a breadth varying from 7 to 14 miles; the shores are closely bounded by mountainous ridges, mostly of granite, which continue to preserve the same direction far beyond the head of the gulf, and are said to terminate on the borders of the Dead sea; in many places they rise from the plain like a wall, and the passes over them are extremely difficult. Where sandy points occur on the shores of the gulf, they are all caused by torrents at times washing the sand out of the larger valleys.

The mountainous district on the eastern side of the gulf of Akaba is inhabited by two strong tribes, the Omran and Howatat, who are perfectly distinct from each other but closely connected by alliance. By the Arabs of the seaport towns, these tribes are held in great detestation, the Arabs whenever obliged to anchor on their coast are careful to select such spots as are out of their reach.

During the greater part of the year, N.N.E. winds blow with great fury down the gulf of Akaba, but in April and May they are generally more moderate, and an occasional change to a southerly wind occurs in that period, which makes it the most favourable time for an ascent of the gulf by a sailing vessel.

Captain Moresby, who surveyed the gulf of Akaba in 1833, remarks:—

“In this part of the Red sea the winds are drawn to the southward by very high ranges of mountains, bounding closely both sides of the gulf, and opening like a funnel to the northward in Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence that the wind raises the sea into a deep and turbulent swell; the place is almost void of soundings and anchorages, except in a few spots hereafter mentioned.

“Native vessels do not navigate the gulf of Akaba, and they dread crossing the Red sea near its entrance. Many vessels have been lost in

the gulf, and very heavy weather was experienced by the *Palinurus* during the survey."

H.M.S. *Gannet*, visiting the gulf for a week at the end of August 1894, found northerly winds of light to moderate force, and late Egyptian reports tend to show that better weather than that experienced in 1833 not unfrequently prevails.

Soundings.—The depths in the gulf of Akaba are greater than those in the gulf of Suez, no bottom being found at 130 fathoms in the former; the shores are steep-to. The bottom of the gulf of Akaba is a continuation of the valley in which lie the Dead sea and river Jordan, both of which are much below the level of the Mediterranean.

Strait of Tirán.—The entrance of the gulf of Akaba is nearly closed by the island of Tirán with its extensive reefs. The strait of Tirán is the passage on the western side of that island; it is 4 miles wide, and there are 70 fathoms within a mile of Ras Nuzerani on the western side. Reefs project to the westward from Tirán island towards the coast reef, extending half a mile from Ras Nuzerani, leaving a narrow channel only about 2 cables in width between the edges of these dangers. The wreck of the Turkish steamer *Gedikler*, nearly high and dry, lies (1896) on the south-western part of the reef, extending westward from Tirán. Through this channel the wind and swell come down with great violence. There is also a passage north-eastward of Tirán, from $3\frac{1}{2}$ miles to a quarter of a mile wide; and, notwithstanding the numerous and extensive reefs in it, this is the best and safest channel for a sailing vessel, as there is anchorage throughout as far as Ras Fartak, the eastern point of entrance to the gulf on the mainland.

ANCHORAGES.—For the convenience of those navigating the gulf of Akaba, the descriptions of the anchorages affording shelter in case of need are now given in the order in which they come on either hand as a vessel proceeds northward.

Ras Fartak.—Southward of Ras Fartak there is good anchorage, and here a vessel may remain until the wind allows her to proceed up the gulf, which at this point, in lat. $28^{\circ} 6' N.$, is $6\frac{1}{2}$ miles wide; it then widens considerably. The first anchorage above Ras Fartak is on the eastern shore, in Sherm Mujawar, a snug cove with a narrow entrance, between 6 and 7 miles from Ras Fartak; south of the land-spit in the middle of the harbour the depth is $2\frac{1}{2}$ fathoms. Five miles farther, good anchorage will be found in Sherm Dhaba. From this, there is no anchorage on the eastern side until Bir-al-Mashiya, presently described, in lat. $28^{\circ} 51\frac{1}{2}' N.$

Mersa Dahab, or the Golden Port, probably the Eziongeber of the Bible, is on the westward side of the gulf, in lat. $28^{\circ} 28' N.$, long. $34^{\circ} 30' E.$, and is distant $32\frac{1}{2}$ miles from the peak on Tirán island,

See chart, No. 8a, and plan, No. 3,047.

and E. by S. $\frac{3}{8}$ S. nearly 29 miles from mount Sinai. This port is formed by a sandy point extending eastward from the line of coast nearly 2 miles, and then turning first southward and then westward; on the outer extreme of the point is a large date grove; among the trees, indifferent water may be found in some wells. The date grove is inhabited during the fruit season, but the Turwari Arabs return before the winter months for pasture in the valleys of the immense mountains in the dreary peninsula of Sinai.

Within the flat land-spit which encloses the small harbour, is a perfectly sheltered little anchorage, with good holding ground. Also, outside the land-spit, westward of the point, there is good anchorage in about 8 fathoms, but the ground in the vicinity is rocky and uneven. A reef projects S.S.W. $3\frac{1}{4}$ cables from the outer or south-east end of the land-spit, which is quite covered at high water.

Ras Arser.—The next anchorage is on the same side about 10 miles N.N.E. of Dahab, under the lee of the sandy point Ras Arser. A bluff point called Windy cape projects out to seaward, but there is no anchorage there.

Wasit, where good anchorage may be obtained during northerly winds, is a low sandy point 13 miles N.N.E. from Ras Arser.

Bir-al-Mashiya, is a temporary anchorage on the eastern side of the gulf in lat $28^{\circ} 51\frac{1}{2}'$ N., and E. by N. 10 miles from Wasit; it is 8 or 10 miles northward of a bluff headland which bounds the view on the eastern side of the gulf, from a vessel either in the northern or southern part of it. The anchorage is under a sandy point in 5 or 6 fathoms, well protected from northerly winds, or farther eastward in 12 fathoms at $1\frac{1}{2}$ cables from the shore; the depth increases very rapidly to seaward. A small patch of rocks surrounds this point and extends a little to seaward, but there is deep water a mile from the shore.

Nawibi, another low sandy point on the Sinai side with a large grove of date trees on it, is 7 miles northward of Wasit, and about 10 miles north-westward of Bir-al-Mashiya; it is in lat. $28^{\circ} 57'$ N. This spot affords good shelter from northerly winds, in $7\frac{1}{2}$ fathoms, coral and sand; indifferent water may be obtained among the date trees, where there are some wells. There are some coral banks, with less than 2 feet water over them, in the western part of the roadstead, with 5 fathoms close to, the anchorage is otherwise clear. There is a frontier fort at about 3 miles north of the anchorage at Nawibi, with a small Egyptian garrison, which can be seen at the distance of 5 miles; a palm grove fringes the shore to the southward.

Abu Ramlah, the northern point of a small bay about 12 miles above Nawibi on the same side, is the next anchorage, and is sheltered from

northerly winds. It is in lat. $29^{\circ} 8' N.$, and its position may be known by that of White cape, a white patch or sand-drift on the lower hills, $2\frac{1}{2}$ miles N.N.E. of the point.

Between White cape and Jezirat Faraun or Pharaoh island, near the head of the gulf, there are three more anchorages in small bays on the Sinai side, affording shelter from north-easterly winds; the first is 2 miles northward of White cape; the next, North $7\frac{1}{2}$ miles from White cape; the third, N.N.E. about $11\frac{1}{2}$ miles. The distance from White cape to the opposite shore, where there is a small bay with Omeider island in the centre, is 9 miles. There is good anchorage between that island and the mainland, but like all other anchorages except Dahab and Mujawar cove, it is exposed to southerly winds, which sometimes in the winter months, come on suddenly and blow hard for a day or for a few hours.

Tides.—At Omeider it is high water, full and change, at 6 h.; the rise is 4 feet.

Jezirat Faraun or Pharaoh island, about a quarter of a mile long and 300 or 400 yards wide, is in lat. $29^{\circ} 25' N.$, and from the fort and village of Akaba, it bears W.S.W. about 8 miles. The island of Faraun is a barren rock surrounded by an old Saracenic castle, now in ruins, in which are the remains of capacious water tanks; it is about 2 cables from the mainland, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akaba will sometimes bring supplies to this place in five or six hours, but they are not to be trusted.

Akaba is a small Arab village, in an extensive date grove on the eastern shore, nearly at the head of the gulf. Close to the village there is a small square fort, garrisoned by Turkish soldiers. This is a dépôt for grain, for the use of caravans on their way to and from Mecca, and a small supply of provisions may be obtained here. The fort is in lat. $29^{\circ} 29' N.$, long. $35^{\circ} 1' E.$ Near the fort and in the adjacent country are numerous ruins.

Anchorage may be had off Akaba in 11 fathoms, with the fort bearing E.N.E., and distant 2 cables; in southerly winds it is advisable, in order to obtain some shelter from the heavy sea, to be farther south as near as convenient to the point.

From the fort of Akaba, the head of this gulf forms a circular bay, 3 miles to the northward and north-westward, and the same distance across, but abreast of Faraun island, it is about 6 miles wide. The coast at the head of the sea is very low being the end of the sandy valley called Wadi-el-Araba, which is bounded on each side by high mountains.

See chart, No. 8a, and plan, No. 3,047.

Anchorage.—At the head of the gulf, there is good anchorage with protection from northerly winds; in anchoring at this place, it must be recollected that southerly winds bring up a heavy swell.

Water.—Water may always be obtained at the head of the gulf by digging a few feet deep, close to the beach.

TIRÁN ISLAND, in the entrance to the gulf of Akaba, is about 7 miles long by 5 miles wide. On its southern part, near the centre, is a peak 1,670 feet high, in lat. $27^{\circ} 55' N.$, long. $34^{\circ} 34' E.$ a useful mark in entering or leaving the gulf of Suez; the remaining part is a low sandy plain, nearly divided by a long inlet on its north-eastern side. The south-east part of the island is surrounded by a reef, but close off the southern and western sides there are no soundings; the western side is 4 miles distant from the peninsula of Sinai, but the navigable channel into the gulf of Akaba is only about 2 cables in width between the edges of the reefs extending from the north-western and north-eastern sides of Tirán, and those of the coast reefs on both the eastern and western sides. On the south-western part of the latter lies the wreck previously mentioned.

There is no water on Tirán except that left in the holes of the rocks after rain, and it produces nothing but colocynth plants and saline shrubs; it is infested with wild beasts.

Anchorage.—There is anchorage sheltered from all sea on the north-eastern side of the island, with the peak bearing S.W. by W. $\frac{1}{2}$ W.; it is approached by a channel 4 cables wide between the reefs round the east end of the island and the shoal in the centre of the passage between it and Senafir island; the bottom is everywhere rocky and foul.

Senafir, 2 miles eastward of Tirán, is rather a large island of semicircular form, opening into a fine bay on its southern side, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom, but it is open to southerly winds. At the mouth of this bay there is a 5-fathoms bank, and N.E. by E. from its south-west entrance point a rock with less than 2 fathoms over it. Soundings of 15 and 25 fathoms extend some distance southward of the island, but a small shoal, before referred to, exists in the centre of the channel between it and Tirán. Numerous broken peaked limestone hills cover the eastern part of the island, the highest is near its south-eastern end.

The Coast.—From the south-eastern point of entrance to the gulf of Akaba to the harbour of Eynunah, in lat. $28^{\circ} 2' N.$, long. $35^{\circ} 13' E.$, the coast is low and sandy gradually rising from the sea, deeply indented, and fronted by coral reefs, having narrow and intricate channels between them, barely navigable for boats. Between Eynunah and Mowila the patches of reefs are wider apart, and for a considerable extent deep water extends to within a short distance of the shore. In this part, the coast is

backed by lofty mountains, attaining a height at Mowila peak of 9,000 feet. The mountains in this locality are nearer the sea than in other parts, and the land between affords plenty of fire-wood and grazing for sheep.

EYNUNAH.—This harbour, although its approach is formidable from the number of outlying reefs, may, with the assistance of a good pilot, be entered with facility and safety. Towards the interior, at the distance of $1\frac{1}{2}$ miles from the beach, between two barren and rocky hills, is the valley of Eynunah, celebrated among the Bedouins for the purity and abundance of its water. About 2 miles from the beach, a long line of cliffs rises from the plain and forms the outer edge of an extensive tract of table land. The appearance of the luxuriant, though uncultivated, tract contrasts strangely with the wild sterility of the neighbouring scenery. On both sides of the valley are ruins, said to be the remains of a Nazarine or Christian town, and from it, leading to the beach, may be seen an aqueduct by which water was formerly conveyed to a reservoir near the beach. There are still some remains of this work. Jebel Eynunah, 6,090 feet high, bears N. by E. 15 miles from the anchorage.

SHUSHUAH ISLAND lies East 8 miles from Senafir; from its low northern point it gradually increases in height to a bluff 200 feet high at the southern extreme. On some bearings, therefore, the island appears wedge-shaped. The whole island appears to be formed of variegated red and yellow sandstone, mixed with coral. Large masses of the latter, of the madrepore or branched form, so often met with on reefs near the surface, may, when the rain has washed away the soil, be seen embedded in the rocks; and loose broken pieces of the branched kind, besides petrified shells and other marine remains, are thickly strewed over the surface.

The southern side of Shushuah is steep-to, there being no bottom at 50 fathoms; but on the eastern side a small reef projects, off which soundings extend a short distance on which there is anchorage in 7 or 8 fathoms, sandy and rocky bottom.

BARAKAN ISLAND lies E. by S. $\frac{1}{2}$ S. 7 miles from Shushuah, and is divided into two parts connected by a low sandy tract, so that from a distance its two wedge-shaped hills appear as two separate islets. It is about $2\frac{1}{2}$ miles long and 100 feet high. On a near approach, its broken and rugged appearance is very remarkable, large masses which have been detached from the body of the hills lying scattered at their bases. Off its north-western end and eastern side are some patches of sunken rocks; the western and southern sides are safe to approach within a moderate distance, but it is fringed with reef.

Anchorage.—There is good anchorage with sandy bottom close to the south-eastern end of the island, well sheltered from north-westerly

See chart, No. 8a.

winds. There is also anchorage in from 7 to 15 fathoms eastward of the isthmus connecting the two parts of the island; a good berth should be given to the southern part of the island in rounding it for this anchorage, which should not be steered for until the isthmus bears about W. by N. A good look-out from aloft should be kept for coral reefs, as there are many awash in these parts, not shown on the charts. If required, a pilot for Eynunah can generally be obtained at this anchorage.

YUBA ISLAND, its northern end in lat. $27^{\circ} 46' N$, long $35^{\circ} 7\frac{1}{2}' E$., is 2 miles in length north-east and south-east, its northern end being a precipitous cliff 350 feet high, sloping gradually to the south-eastern end. The south-western side is fringed by reef on which are two or three rocky islets, but there are neither soundings nor anchorage near this island. Wyler and Jelajli islands, two low small coral islands, lie 2 or 3 miles eastward of Yuba, and there is also a small reef one mile S.E. from the southern end of Yuba, and another, Shab Pelham, N.N.W. $2\frac{1}{2}$ miles from the northern end, having no soundings near them.

Yuba island is about West 12 miles from Ras Wadi Turiam on the mainland, and between it and the shore are many reefs with deep water between them, and this is the general character of the bight lying inside the islands just described from Tirán south-eastward (*see* also p. 245).

Sila islands are a group of low coral islets which, with the reefs on which they stand, are 7 miles long in a north-west and south-east direction, the southern end being in lat. $27^{\circ} 37' N$., about 12 miles south-eastward of Yuba, and 9 miles W. $\frac{3}{4}$ S. from Mowila.

Between this group and the reef extending off Mowila, there is a narrow channel, but the Sila island reefs extend fully 2 miles eastward and south-eastward of those islets, and, with light winds, no sailing vessel should use it, as there is no anchorage near the Sila islands nor near the reef just mentioned.

MOWILA.—In lat. $27^{\circ} 40' N$., long $35^{\circ} 29' E$., is the village and fortress of Mowila; it is also a depôt for grain for the Moslem pilgrims. A small Turkish garrison protects the place. The coast in the vicinity is low, gradually rising to hills of great height in the background.

Reefs.—From Mowila, a reef extends W. $\frac{1}{2}$ N. 9 miles, which, at its broadest part, is 3 miles wide. In a south-west direction from Mowila there is a shoal bank of 10 fathoms, and between this and the reef mentioned there is a deep water channel. Another shoal bank, having on it numerous rocky patches, lies in a south-south-west direction from Mowila. It is 10 miles long N.N.W. and S.S.E., and its least distance from the shore is $2\frac{1}{2}$ miles.

Between the last-named reef and the shore is a deep channel, but it is not recommended for a sailing vessel as the reefs have no soundings near the shore. With light winds, a vessel might anchor among the shoal patches on this reef, and temporary anchorage has sometimes been found on the reef, 2 miles westward of Mowila.

Supplies.—From Mowila, excellent sheep and water may be obtained, but the anchorage is unfit for either ship or boat, in addition to which the approaches are very dangerous. Should a vessel require water or other supplies, besides getting good shelter, she should run into Sherm Yahar, presently described, 4 miles S.S.E. from Mowila. There is a caravan route to Medina through Tebuk.

Inhabitants.—The country in this vicinity from Akaba to Nomán island is under the control of three powerful tribes, the Howatat, the Omran, and the Uleggat. Their character is so bad for treachery and ferocity that the Arabs of the bágalas will not land upon their coast. The country bordering on the sea coast affords excellent pasture. Between Eynunah and Mowila the Bedouins' huts are numerous, and large flocks of sheep and goats are met with. Their residence, however, is merely temporary; for, should the rain fail them—an event that occurs about once in four years—they retreat from the low countries to their mountains. In this elevated range, of which many hills are above 6,000 feet in height, they possess abundance of water and a never-failing supply of herbage.

Mowila peak.—This remarkable mountain bears E. by S. $\frac{1}{2}$ S. about 14 miles from Mowila, and is a conspicuous object from the sea. The land from the sea-shore near Mowila rises gradually during 6 or 7 miles, when it ascends abruptly to mountains of great height, terminating in the sharp and singular peaks known as mount Mowila. These are in reality very sharp ridges which on some bearings show as peaks, especially from the southward, when they have an irregular columnar appearance with chasms rather than valleys between them. When viewed from the northward most of these peaks are shut in, and mount Mowila then appears as a narrow ridge. It is at the south-eastern extreme of an immense range of high mountains, and its highest point, said to be 9,000 feet high, is in lat. $27^{\circ} 36\frac{1}{2}'$ N., long. $35^{\circ} 45'$ E.

SHERM YAHAR is a small inlet about half a mile deep, 4 miles S.S.E. from Mowila; the entrance is narrow, being only half a cable wide, with from 17 to 10 fathoms in mid-channel; inside, the anchoring space in some places is three-quarters of a cable wide. This small harbour is well sheltered from the prevailing winds, being open to the south-west; the anchorage depths are from 6 to 8 fathoms. On the northern side of the entrance is a pile of stones raised by the Arabs, without which it would be difficult to distinguish it, as the land is low in the vicinity.

See chart, No. 8a, with plan of Sherm Yahar.

Supplies.—Wood and good water, in small quantities, may be procured from the Bedouins, who bring these articles from Mowila and from the interior on camels for sale to the boats that put in here on their passage up and down the coast. Sheep at moderate prices may also be obtained.

SHERM JÚBBA, in lat. $27^{\circ} 33' N.$, $3\frac{1}{2}$ miles south-eastward from Sherm Yahar, is a small inlet about 8 cables long, which affords good anchorage; the entrance channel is very narrow, about half a cable, and the points of the coral reefs from either shore make it very winding. The depths are from 17 and 14 fathoms in the entrance, to 6 or 7 fathoms in a space $1\frac{1}{2}$ cables wide at the head, where there is good and secure anchorage. At $3\frac{1}{2}$ miles from the shore, near Sherm Júbba, is the extensive shoal already mentioned, running nearly parallel with the shore for about 10 miles. Between this shoal and the coast, no bottom was found at 70 fathoms.

The Coast.—From Mowila to Nomán island, the coast has a general S.S.E. direction for about 35 miles, with here and there an occasional small inlet or sherm, affording shelter to the native coasting vessels and boats.

Sherm Zibber and Sherm Kafafa.—Besides Sherms Yahar and Júbba, already noticed, there are Sherm Zibber and Sherm Kafafa. At the former, wood may be procured, and water from some wells near the sea, but the anchorage is bad. At the latter place, the anchorage is also bad; on its southern side is the village of Diba, consisting of a few small houses by the sea-shore and a fort. There is a very fair road from Diba to Mowila, but it ends near the latter place in a defile through which only one camel can pass at a time.

Abreast of these two inlets is a reef which extends N.W. by N. 5 miles, and is $3\frac{1}{2}$ miles from the shore. There is deep water between the rocky heads on the reef, and no soundings at 70 fathoms between the reef and the shore.

NOMÁN ISLAND, of which the northern end is in lat. $27^{\circ} 8' N.$ is 4 miles long in a N.N.W. and S.S.E. direction, and one mile wide; it is low and sandy at the northern end, rising gradually to the southern end where it attains a height of about 400 feet in abrupt red limestone cliffs and hills. These hills are skirted by a few bushes, but are otherwise destitute of vegetation and of a very rugged appearance.

Soundings.—From the northern end of the island, a reef extends N.N.W. $4\frac{1}{2}$ miles nearly, but there are no soundings near it. Between Nomán and Ras Abu Massahrib on the mainland, distant $1\frac{1}{2}$ miles, there is a navigable channel, but care must be taken to avoid several rocky patches in it. The mainland abreast of Nomán and also the land for 7 or

See chart, No. 8a, with plan of Sherm Júbba.

northerly winds. It is in lat. $29^{\circ} 8' N.$, and its position may be known by that of White cape, a white patch or sand-drift on the lower hills, $2\frac{1}{2}$ miles N.N.E. of the point.

Between White cape and Jezirat Faraun or Pharaoh island, near the head of the gulf, there are three more anchorages in small bays on the Sinai side, affording shelter from north-easterly winds; the first is 2 miles northward of White cape; the next, North $7\frac{1}{2}$ miles from White cape; the third, N.N.E. about $11\frac{1}{2}$ miles. The distance from White cape to the opposite shore, where there is a small bay with Omeider island in the centre, is 9 miles. There is good anchorage between that island and the mainland, but like all other anchorages except Dahab and Mujawar cove, it is exposed to southerly winds, which sometimes in the winter months, come on suddenly and blow hard for a day or for a few hours.

Tides.—At Omeider it is high water, full and change, at 6 h.; the rise is 4 feet.

Jezirat Faraun or Pharaoh island, about a quarter of a mile long and 300 or 400 yards wide, is in lat. $29^{\circ} 25' N.$, and from the fort and village of Akaba, it bears W.S.W. about 8 miles. The island of Faraun is a barren rock surrounded by an old Saracenic castle, now in ruins, in which are the remains of capacious water tanks; it is about 2 cables from the mainland, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akaba will sometimes bring supplies to this place in five or six hours, but they are not to be trusted.

Akaba is a small Arab village, in an extensive date grove on the eastern shore, nearly at the head of the gulf. Close to the village there is a small square fort, garrisoned by Turkish soldiers. This is a dépôt for grain, for the use of caravans on their way to and from Mecca, and a small supply of provisions may be obtained here. The fort is in lat. $29^{\circ} 29' N.$, long. $35^{\circ} 1' E.$ Near the fort and in the adjacent country are numerous ruins.

Anchorage may be had off Akaba in 11 fathoms, with the fort bearing E.N.E., and distant 2 cables; in southerly winds it is advisable, in order to obtain some shelter from the heavy sea, to be farther south as near as convenient to the point.

From the fort of Akaba, the head of this gulf forms a circular bay, 3 miles to the northward and north-westward, and the same distance across, but abreast of Faraun island, it is about 6 miles wide. The coast at the head of the sea is very low being the end of the sandy valley called Wadi-el-Araba, which is bounded on each side by high mountains.

Anchorage.—At the head of the gulf, there is good anchorage with protection from northerly winds; in anchoring at this place, it must be recollected that southerly winds bring up a heavy swell.

Water.—Water may always be obtained at the head of the gulf by digging a few feet deep, close to the beach.

TIRÁN ISLAND, in the entrance to the gulf of Akaba, is about 7 miles long by 5 miles wide. On its southern part, near the centre, is a peak 1,670 feet high, in lat. $27^{\circ} 55' N.$, long. $34^{\circ} 34' E.$ a useful mark in entering or leaving the gulf of Suez; the remaining part is a low sandy plain, nearly divided by a long inlet on its north-eastern side. The south-east part of the island is surrounded by a reef, but close off the southern and western sides there are no soundings; the western side is 4 miles distant from the peninsula of Sinai, but the navigable channel into the gulf of Akaba is only about 2 cables in width between the edges of the reefs extending from the north-western and north-eastern sides of Tirán, and those of the coast reefs on both the eastern and western sides. On the south-western part of the latter lies the wreck previously mentioned.

There is no water on Tirán except that left in the holes of the rocks after rain, and it produces nothing but colocynth plants and saline shrubs; it is infested with wild beasts.

Anchorage.—There is anchorage sheltered from all sea on the north-eastern side of the island, with the peak bearing S.W. by W. $\frac{1}{2}$ W.; it is approached by a channel 4 cables wide between the reefs round the east end of the island and the shoal in the centre of the passage between it and Senafir island; the bottom is everywhere rocky and foul.

Senafir, 2 miles eastward of Tirán, is rather a large island of semicircular form, opening into a fine bay on its southern side, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom, but it is open to southerly winds. At the mouth of this bay there is a 5-fathoms bank, and N.E. by E. from its south-west entrance point a rock with less than 2 fathoms over it. Soundings of 15 and 25 fathoms extend some distance southward of the island, but a small shoal, before referred to, exists in the centre of the channel between it and Tirán. Numerous broken peaked limestone hills cover the eastern part of the island, the highest is near its south-eastern end.

The Coast.—From the south-eastern point of entrance to the gulf of Akaba to the harbour of Eynunah, in lat. $28^{\circ} 2' N.$, long. $35^{\circ} 13' E.$, the coast is low and sandy gradually rising from the sea, deeply indented, and fronted by coral reefs, having narrow and intricate channels between them, barely navigable for boats. Between Eynunah and Mowila the patches of reefs are wider apart, and for a considerable extent deep water extends to within a short distance of the shore. In this part, the coast is

page 29, there is no probability of their being frequented by steam-vessels to any appreciable extent in the absence of ports of trade requiring their use.

Winds and Weather in the Inner channel.—At page 116 is given a short outline of the winds usually experienced in the Inner channel on the western side of the Red sea. The winds and weather are very similar on the Arabian side; but the Indian surveying vessels remarked in 1830–1834 that although they experienced land and sea breezes on the Arabian shore more frequently in March and April than on the African side, the land squalls in the southern part of the sea occurred in April and May. From May to July, when they experienced them on the Nubian coast, there was thick hazy weather and heavy dews on the Arabian side opposite; *see also* remarks on winds, weather, rainfall, &c., in Chap. I., and at the end of the present chapter.

The COAST.—Ras Muhammed has been fully described at page 113. The land leading to the Ras from the high land of the peninsula of Sinai which separates the gulfs of Suez and Akaba, is a long narrow tract nearly divided from the peninsula about 5 miles from the Ras, by the deep bay of Ghazulani on the eastern side. Immediately northward of this, a range of mountains takes its rise and extends nearly the whole length of the peninsula; the general height of these mountains is from 3,000 to 5,000 feet, and during the winter months the summits of the highest are frequently covered with snow.

From the narrow neck described, near Ras Muhammed, to the entrance of the gulf of Akaba, the coast is high and precipitous, having no soundings near the shore.

Sherm Sheikh and Sherm ul Moiya.—About 8 miles northward from Ras Muhammed are the two small harbours, Sherm Sheikh and Sherm ul Moiya, separated from each other by a rocky tongue of land 50 to 70 feet in height. The western, Sherm Sheikh, which derives its name from the tomb of a sheikh, at the eastern extreme of the bay, is the more capacious and has a wider entrance than the other. It affords good anchorage abreast the tomb at about $1\frac{1}{2}$ cables from the shore, in a depth of about 14 fathoms, sand, but care must be exercised in taking a berth as the bank drops abruptly into deep water.

The narrow entrance to the completely sheltered inner basin of Sherm ul Moiya is so obstructed by coral banks, that a ship drawing more than 10 feet can only make its way through these obstacles with the greatest caution, and there is no anchorage outside them. There are wells in Sherm ul Moiya containing but little water, and that brackish; they are situated on the western side of the bay about 150 yards from the shore.

See chart, No. 757, and plan, No. 3,047.

From this place, Mount Sinai may be reached in $2\frac{1}{2}$ days by a comparatively good road.

In this locality, when it is blowing hard from N.N.W. out of the gulf of Suez and N.N.E. out of the gulf of Akaba, the winds meet, coming in gusts, and changing in a few seconds, from both quarters. Still, a sailing-vessel with perseverance, can get to an anchor by keeping well to windward, and then running along shore. From these harbours, the Bedouin Arabs of Tor are always on the look-out, eager and happy to convey letters or passengers from here to Suez or Cairo. They are civil and attentive, and may be freely trusted; in four days they take letters to Suez. Between Ras Muhammed and these harbours there is no anchorage on the coast; the mountains are close to the sea and present a grand range extending N.N.E. and N.N.W., from 3,000 to 5,000 feet high.

The GULF of AKABA, has a general N.N.E. direction for 98 miles, with a breadth varying from 7 to 14 miles; the shores are closely bounded by mountainous ridges, mostly of granite, which continue to preserve the same direction far beyond the head of the gulf, and are said to terminate on the borders of the Dead sea; in many places they rise from the plain like a wall, and the passes over them are extremely difficult. Where sandy points occur on the shores of the gulf, they are all caused by torrents at times washing the sand out of the larger valleys.

The mountainous district on the eastern side of the gulf of Akaba is inhabited by two strong tribes, the Omran and Howatat, who are perfectly distinct from each other but closely connected by alliance. By the Arabs of the seaport towns, these tribes are held in great detestation, the Arabs whenever obliged to anchor on their coast are careful to select such spots as are out of their reach.

During the greater part of the year, N.N.E. winds blow with great fury down the gulf of Akaba, but in April and May they are generally more moderate, and an occasional change to a southerly wind occurs in that period, which makes it the most favourable time for an ascent of the gulf by a sailing vessel.

Captain Moresby, who surveyed the gulf of Akaba in 1833, remarks:—

“In this part of the Red sea the winds are drawn to the southward by very high ranges of mountains, bounding closely both sides of the gulf, and opening like a funnel to the northward in Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence that the wind raises the sea into a deep and turbulent swell; the place is almost void of soundings and anchorages, except in a few spots hereafter mentioned.

“Native vessels do not navigate the gulf of Akaba, and they dread crossing the Red sea near its entrance. Many vessels have been lost in

the gulf, and very heavy weather was experienced by the *Palinurus* during the survey."

H.M.S. *Gannet*, visiting the gulf for a week at the end of August 1894, found northerly winds of light to moderate force, and late Egyptian reports tend to show that better weather than that experienced in 1833 not unfrequently prevails.

Soundings.—The depths in the gulf of Akaba are greater than those in the gulf of Suez, no bottom being found at 130 fathoms in the former; the shores are steep-to. The bottom of the gulf of Akaba is a continuation of the valley in which lie the Dead sea and river Jordan, both of which are much below the level of the Mediterranean.

Strait of Tirán.—The entrance of the gulf of Akaba is nearly closed by the island of Tirán with its extensive reefs. The strait of Tirán is the passage on the western side of that island; it is 4 miles wide, and there are 70 fathoms within a mile of Ras Nuzerani on the western side. Reefs project to the westward from Tirán island towards the coast reef, extending half a mile from Ras Nuzerani, leaving a narrow channel only about 2 cables in width between the edges of these dangers. The wreck of the Turkish steamer *Gedikler*, nearly high and dry, lies (1896) on the south-western part of the reef, extending westward from Tirán. Through this channel the wind and swell come down with great violence. There is also a passage north-eastward of Tirán, from $3\frac{1}{2}$ miles to a quarter of a mile wide; and, notwithstanding the numerous and extensive reefs in it, this is the best and safest channel for a sailing vessel, as there is anchorage throughout as far as Ras Fartak, the eastern point of entrance to the gulf on the mainland.

ANCHORAGES.—For the convenience of those navigating the gulf of Akaba, the descriptions of the anchorages affording shelter in case of need are now given in the order in which they come on either hand as a vessel proceeds northward.

Ras Fartak.—Southward of Ras Fartak there is good anchorage, and here a vessel may remain until the wind allows her to proceed up the gulf, which at this point, in lat. $28^{\circ} 6' N.$, is $6\frac{1}{2}$ miles wide; it then widens considerably. The first anchorage above Ras Fartak is on the eastern shore, in Sherm Mujawar, a snug cove with a narrow entrance, between 6 and 7 miles from Ras Fartak; south of the land-spit in the middle of the harbour the depth is $2\frac{1}{2}$ fathoms. Five miles farther, good anchorage will be found in Sherm Dhaba. From this, there is no anchorage on the eastern side until Bir-al-Mashiya, presently described, in lat. $28^{\circ} 51\frac{1}{2}' N.$

Mersa Dahab, or the Golden Port, probably the Eziongeber of the Bible, is on the westward side of the gulf, in lat. $28^{\circ} 28' N.$, long. $34^{\circ} 30' E.$, and is distant $32\frac{1}{2}$ miles from the peak on Tirán island,

See chart, No. 8a, and plan, No. 3,047.

and E. by S. $\frac{3}{8}$ S. nearly 29 miles from mount Sinai. This port is formed by a sandy point extending eastward from the line of coast nearly 2 miles, and then turning first southward and then westward; on the outer extreme of the point is a large date grove; among the trees, indifferent water may be found in some wells. The date grove is inhabited during the fruit season, but the Turwari Arabs return before the winter months for pasture in the valleys of the immense mountains in the dreary peninsula of Sinai.

Within the flat land-spit which encloses the small harbour, is a perfectly sheltered little anchorage, with good holding ground. Also, outside the land-spit, westward of the point, there is good anchorage in about 8 fathoms, but the ground in the vicinity is rocky and uneven. A reef projects S.S.W. $3\frac{1}{4}$ cables from the outer or south-east end of the land-spit, which is quite covered at high water.

Ras Arser.—The next anchorage is on the same side about 10 miles N.N.E. of Dahab, under the lee of the sandy point Ras Arser. A bluff point called Windy cape projects out to seaward, but there is no anchorage there.

Wasit, where good anchorage may be obtained during northerly winds, is a low sandy point 13 miles N.N.E. from Ras Arser.

Bir-al-Mashiya, is a temporary anchorage on the eastern side of the gulf in lat $28^{\circ} 51\frac{1}{2}'$ N., and E. by N. 10 miles from Wasit; it is 8 or 10 miles northward of a bluff headland which bounds the view on the eastern side of the gulf, from a vessel either in the northern or southern part of it. The anchorage is under a sandy point in 5 or 6 fathoms, well protected from northerly winds, or farther eastward in 12 fathoms at $1\frac{1}{2}$ cables from the shore; the depth increases very rapidly to seaward. A small patch of rocks surrounds this point and extends a little to seaward, but there is deep water a mile from the shore.

Nawibi, another low sandy point on the Sinai side with a large grove of date trees on it, is 7 miles northward of Wasit, and about 10 miles north-westward of Bir-al-Mashiya; it is in lat. $28^{\circ} 57'$ N. This spot affords good shelter from northerly winds, in $7\frac{1}{2}$ fathoms, coral and sand; indifferent water may be obtained among the date trees, where there are some wells. There are some coral banks, with less than 2 feet water over them, in the western part of the roadstead, with 5 fathoms close to, the anchorage is otherwise clear. There is a frontier fort at about 3 miles north of the anchorage at Nawibi, with a small Egyptian garrison, which can be seen at the distance of 5 miles; a palm grove fringes the shore to the southward.

Abu Ramlah, the northern point of a small bay about 12 miles above Nawibi on the same side, is the next anchorage, and is sheltered from

northerly winds. It is in lat. $29^{\circ} 8' N.$, and its position may be known by that of White cape, a white patch or sand-drift on the lower hills, $2\frac{1}{2}$ miles N.N.E. of the point.

Between White cape and Jezirat Faraun or Pharaoh island, near the head of the gulf, there are three more anchorages in small bays on the Sinai side, affording shelter from north-easterly winds; the first is 2 miles northward of White cape; the next, North $7\frac{1}{2}$ miles from White cape; the third, N.N.E. about $11\frac{1}{2}$ miles. The distance from White cape to the opposite shore, where there is a small bay with Omeider island in the centre, is 9 miles. There is good anchorage between that island and the mainland, but like all other anchorages except Dahab and Mujawar cove, it is exposed to southerly winds, which sometimes in the winter months, come on suddenly and blow hard for a day or for a few hours.

Tides.—At Omeider it is high water, full and change, at 6 h.; the rise is 4 feet.

Jezirat Faraun or Pharaoh island, about a quarter of a mile long and 300 or 400 yards wide, is in lat. $29^{\circ} 25' N.$, and from the fort and village of Akaba, it bears W.S.W. about 8 miles. The island of Faraun is a barren rock surrounded by an old Saracenic castle, now in ruins, in which are the remains of capacious water tanks; it is about 2 cables from the mainland, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akaba will sometimes bring supplies to this place in five or six hours, but they are not to be trusted.

Akaba is a small Arab village, in an extensive date grove on the eastern shore, nearly at the head of the gulf. Close to the village there is a small square fort, garrisoned by Turkish soldiers. This is a dépôt for grain, for the use of caravans on their way to and from Mecca, and a small supply of provisions may be obtained here. The fort is in lat. $29^{\circ} 29' N.$, long. $35^{\circ} 1' E.$ Near the fort and in the adjacent country are numerous ruins.

Anchorage may be had off Akaba in 11 fathoms, with the fort bearing E.N.E., and distant 2 cables; in southerly winds it is advisable, in order to obtain some shelter from the heavy sea, to be farther south as near as convenient to the point.

From the fort of Akaba, the head of this gulf forms a circular bay, 3 miles to the northward and north-westward, and the same distance across, but abreast of Faraun island, it is about 6 miles wide. The coast at the head of the sea is very low being the end of the sandy valley called Wadi-el-Araba, which is bounded on each side by high mountains.

See chart, No. 8a, and plan, No. 3,047.

Anchorage.—At the head of the gulf, there is good anchorage with protection from northerly winds; in anchoring at this place, it must be recollected that southerly winds bring up a heavy swell.

Water.—Water may always be obtained at the head of the gulf by digging a few feet deep, close to the beach.

TIRÁN ISLAND, in the entrance to the gulf of Akaba, is about 7 miles long by 5 miles wide. On its southern part, near the centre, is a peak 1,670 feet high, in lat. $27^{\circ} 55' N.$, long. $34^{\circ} 34' E.$ a useful mark in entering or leaving the gulf of Suez; the remaining part is a low sandy plain, nearly divided by a long inlet on its north-eastern side. The south-east part of the island is surrounded by a reef, but close off the southern and western sides there are no soundings; the western side is 4 miles distant from the peninsula of Sinai, but the navigable channel into the gulf of Akaba is only about 2 cables in width between the edges of the reefs extending from the north-western and north-eastern sides of Tirán, and those of the coast reefs on both the eastern and western sides. On the south-western part of the latter lies the wreck previously mentioned.

There is no water on Tirán except that left in the holes of the rocks after rain, and it produces nothing but colocynth plants and saline shrubs; it is infested with wild beasts.

Anchorage.—There is anchorage sheltered from all sea on the north-eastern side of the island, with the peak bearing S.W. by W. $\frac{1}{2}$ W.; it is approached by a channel 4 cables wide between the reefs round the east end of the island and the shoal in the centre of the passage between it and Senafir island; the bottom is everywhere rocky and foul.

Senafir, 2 miles eastward of Tirán, is rather a large island of semicircular form, opening into a fine bay on its southern side, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom, but it is open to southerly winds. At the mouth of this bay there is a 5-fathoms bank, and N.E. by E. from its south-west entrance point a rock with less than 2 fathoms over it. Soundings of 15 and 25 fathoms extend some distance southward of the island, but a small shoal, before referred to, exists in the centre of the channel between it and Tirán. Numerous broken peaked limestone hills cover the eastern part of the island, the highest is near its south-eastern end.

The Coast.—From the south-eastern point of entrance to the gulf of Akaba to the harbour of Eynunah, in lat. $28^{\circ} 2' N.$, long. $35^{\circ} 13' E.$, the coast is low and sandy gradually rising from the sea, deeply indented, and fronted by coral reefs, having narrow and intricate channels between them, barely navigable for boats. Between Eynunah and Mowila the patches of reefs are wider apart, and for a considerable extent deep water extends to within a short distance of the shore. In this part, the coast is

page 29, there is no probability of their being frequented by steam-vessels to any appreciable extent in the absence of ports of trade requiring their use.

Winds and Weather in the Inner channel.—At page 116 is given a short outline of the winds usually experienced in the Inner channel on the western side of the Red sea. The winds and weather are very similar on the Arabian side; but the Indian surveying vessels remarked in 1830–1834 that although they experienced land and sea breezes on the Arabian shore more frequently in March and April than on the African side, the land squalls in the southern part of the sea occurred in April and May. From May to July, when they experienced them on the Nubian coast, there was thick hazy weather and heavy dews on the Arabian side opposite; see also remarks on winds, weather, rainfall, &c., in Chap. I., and at the end of the present chapter.

The COAST.—Ras Muhammed has been fully described at page 113. The land leading to the Ras from the high land of the peninsula of Sinai which separates the gulfs of Suez and Akaba, is a long narrow tract nearly divided from the peninsula about 5 miles from the Ras, by the deep bay of Ghazulani on the eastern side. Immediately northward of this, a range of mountains takes its rise and extends nearly the whole length of the peninsula; the general height of these mountains is from 3,000 to 5,000 feet, and during the winter months the summits of the highest are frequently covered with snow.

From the narrow neck described, near Ras Muhammed, to the entrance of the gulf of Akaba, the coast is high and precipitous, having no soundings near the shore.

Sherm Sheikh and Sherm ul Moiya.—About 8 miles northward from Ras Muhammed are the two small harbours, Sherm Sheikh and Sherm ul Moiya, separated from each other by a rocky tongue of land 50 to 70 feet in height. The western, Sherm Sheikh, which derives its name from the tomb of a sheikh, at the eastern extreme of the bay, is the more capacious and has a wider entrance than the other. It affords good anchorage abreast the tomb at about $1\frac{1}{2}$ cables from the shore, in a depth of about 14 fathoms, sand, but care must be exercised in taking a berth as the bank drops abruptly into deep water.

The narrow entrance to the completely sheltered inner basin of Sherm ul Moiya is so obstructed by coral banks, that a ship drawing more than 10 feet can only make its way through these obstacles with the greatest caution, and there is no anchorage outside them. There are wells in Sherm ul Moiya containing but little water, and that brackish; they are situated on the western side of the bay about 150 yards from the shore.

See chart, No. 757, and plan, No. 3,047.

From this place, Mount Sinai may be reached in $2\frac{1}{2}$ days by a comparatively good road.

In this locality, when it is blowing hard from N.N.W. out of the gulf of Suez and N.N.E. out of the gulf of Akaba, the winds meet, coming in gusts, and changing in a few seconds, from both quarters. Still, a sailing-vessel with perseverance, can get to an anchor by keeping well to windward, and then running along shore. From these harbours, the Bedouin Arabs of Tor are always on the look-out, eager and happy to convey letters or passengers from here to Suez or Cairo. They are civil and attentive, and may be freely trusted; in four days they take letters to Suez. Between Ras Muhammed and these harbours there is no anchorage on the coast; the mountains are close to the sea and present a grand range extending N.N.E. and N.N.W., from 3,000 to 5,000 feet high.

The GULF of AKABA, has a general N.N.E. direction for 98 miles, with a breadth varying from 7 to 14 miles; the shores are closely bounded by mountainous ridges, mostly of granite, which continue to preserve the same direction far beyond the head of the gulf, and are said to terminate on the borders of the Dead sea; in many places they rise from the plain like a wall, and the passes over them are extremely difficult. Where sandy points occur on the shores of the gulf, they are all caused by torrents at times washing the sand out of the larger valleys.

The mountainous district on the eastern side of the gulf of Akaba is inhabited by two strong tribes, the Omran and Howatat, who are perfectly distinct from each other but closely connected by alliance. By the Arabs of the seaport towns, these tribes are held in great detestation, the Arabs whenever obliged to anchor on their coast are careful to select such spots as are out of their reach.

During the greater part of the year, N.N.E. winds blow with great fury down the gulf of Akaba, but in April and May they are generally more moderate, and an occasional change to a southerly wind occurs in that period, which makes it the most favourable time for an ascent of the gulf by a sailing vessel.

Captain Moresby, who surveyed the gulf of Akaba in 1833, remarks:—

“In this part of the Red sea the winds are drawn to the southward by very high ranges of mountains, bounding closely both sides of the gulf, and opening like a funnel to the northward in Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence that the wind raises the sea into a deep and turbulent swell; the place is almost void of soundings and anchorages, except in a few spots hereafter mentioned.

“Native vessels do not navigate the gulf of Akaba, and they dread crossing the Red sea near its entrance. Many vessels have been lost in

page 29, there is no probability of their being frequented by steam-vessels to any appreciable extent in the absence of ports of trade requiring their use.

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The mountainous district on the eastern side of the gulf of Akaba is inhabited by two strong tribes, the Omran and Howatat, who are perfectly distinct from each other but closely connected by alliance. By the Arabs of the seaport towns, these tribes are held in great detestation, the Arabs whenever obliged to anchor on their coast are careful to select such spots as are out of their reach.

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Captain Moresby, who surveyed the gulf of Akaba in 1833, remarks:—

“In this part of the Red sea the winds are drawn to the southward by very high ranges of mountains, bounding closely both sides of the gulf, and opening like a funnel to the northward in Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence that the wind raises the sea into a deep and turbulent swell; the place is almost void of soundings and anchorages, except in a few spots hereafter mentioned.

“Native vessels do not navigate the gulf of Akaba, and they dread crossing the Red sea near its entrance. Many vessels have been lost in

the gulf, and very heavy weather was experienced by the *Palinurus* during the survey."

H.M.S. *Gannet*, visiting the gulf for a week at the end of August 1894, found northerly winds of light to moderate force, and late Egyptian reports tend to show that better weather than that experienced in 1833 not unfrequently prevails.

Soundings.—The depths in the gulf of Akaba are greater than those in the gulf of Suez, no bottom being found at 130 fathoms in the former; the shores are steep-to. The bottom of the gulf of Akaba is a continuation of the valley in which lie the Dead sea and river Jordan, both of which are much below the level of the Mediterranean.

Strait of Tirán.—The entrance of the gulf of Akaba is nearly closed by the island of Tirán with its extensive reefs. The strait of Tirán is the passage on the western side of that island; it is 4 miles wide, and there are 70 fathoms within a mile of Ras Nuzerani on the western side. Reefs project to the westward from Tirán island towards the coast reef, extending half a mile from Ras Nuzerani, leaving a narrow channel only about 2 cables in width between the edges of these dangers. The wreck of the Turkish steamer *Gedikler*, nearly high and dry, lies (1896) on the south-western part of the reef, extending westward from Tirán. Through this channel the wind and swell come down with great violence. There is also a passage north-eastward of Tirán, from $3\frac{1}{2}$ miles to a quarter of a mile wide; and, notwithstanding the numerous and extensive reefs in it, this is the best and safest channel for a sailing vessel, as there is anchorage throughout as far as Ras Fartak, the eastern point of entrance to the gulf on the mainland.

ANCHORAGES.—For the convenience of those navigating the gulf of Akaba, the descriptions of the anchorages affording shelter in case of need are now given in the order in which they come on either hand as a vessel proceeds northward.

Ras Fartak.—Southward of Ras Fartak there is good anchorage, and here a vessel may remain until the wind allows her to proceed up the gulf, which at this point, in lat. $28^{\circ} 6' N.$, is $6\frac{1}{2}$ miles wide; it then widens considerably. The first anchorage above Ras Fartak is on the eastern shore, in Sherm Mujawar, a snug cove with a narrow entrance, between 6 and 7 miles from Ras Fartak; south of the land-spit in the middle of the harbour the depth is $2\frac{1}{2}$ fathoms. Five miles farther, good anchorage will be found in Sherm Dhaba. From this, there is no anchorage on the eastern side until Bir-al-Mashiya, presently described, in lat. $28^{\circ} 51\frac{1}{2}' N.$

Mersa Dahab, or the Golden Port, probably the Eziongeber of the Bible, is on the westward side of the gulf, in lat. $28^{\circ} 28' N.$, long. $34^{\circ} 30' E.$, and is distant $32\frac{1}{2}$ miles from the peak on Tirán island,

See chart, No. 8a, and plan, No. 3,047.

and E. by S. $\frac{3}{8}$ S. nearly 29 miles from mount Sinai. This port is formed by a sandy point extending eastward from the line of coast nearly 2 miles, and then turning first southward and then westward; on the outer extreme of the point is a large date grove; among the trees, indifferent water may be found in some wells. The date grove is inhabited during the fruit season, but the Turwari Arabs return before the winter months for pasture in the valleys of the immense mountains in the dreary peninsula of Sinai.

Within the flat land-spit which encloses the small harbour, is a perfectly sheltered little anchorage, with good holding ground. Also, outside the land-spit, westward of the point, there is good anchorage in about 8 fathoms, but the ground in the vicinity is rocky and uneven. A reef projects S.S.W. $3\frac{1}{4}$ cables from the outer or south-east end of the land-spit, which is quite covered at high water.

Ras Arser.—The next anchorage is on the same side about 10 miles N.N.E. of Dahab, under the lee of the sandy point Ras Arser. A bluff point called Windy cape projects out to seaward, but there is no anchorage there.

Wasit, where good anchorage may be obtained during northerly winds, is a low sandy point 13 miles N.N.E. from Ras Arser.

Bir-al-Mashiya, is a temporary anchorage on the eastern side of the gulf in lat $28^{\circ} 51\frac{1}{2}'$ N., and E. by N. 10 miles from Wasit; it is 8 or 10 miles northward of a bluff headland which bounds the view on the eastern side of the gulf, from a vessel either in the northern or southern part of it. The anchorage is under a sandy point in 5 or 6 fathoms, well protected from northerly winds, or farther eastward in 12 fathoms at $1\frac{1}{2}$ cables from the shore; the depth increases very rapidly to seaward. A small patch of rocks surrounds this point and extends a little to seaward, but there is deep water a mile from the shore.

Nawibi, another low sandy point on the Sinai side with a large grove of date trees on it, is 7 miles northward of Wasit, and about 10 miles north-westward of Bir-al-Mashiya; it is in lat. $28^{\circ} 57'$ N. This spot affords good shelter from northerly winds, in $7\frac{1}{2}$ fathoms, coral and sand; indifferent water may be obtained among the date trees, where there are some wells. There are some coral banks, with less than 2 feet water over them, in the western part of the roadstead, with 5 fathoms close to, the anchorage is otherwise clear. There is a frontier fort at about 3 miles north of the anchorage at Nawibi, with a small Egyptian garrison, which can be seen at the distance of 5 miles; a palm grove fringes the shore to the southward.

Abu Ramlah, the northern point of a small bay about 12 miles above Nawibi on the same side, is the next anchorage, and is sheltered from

northerly winds. It is in lat. $29^{\circ} 8' N.$, and its position may be known by that of White cape, a white patch or sand-drift on the lower hills, $2\frac{1}{2}$ miles N.N.E. of the point.

Between White cape and Jezirat Faraun or Pharaoh island, near the head of the gulf, there are three more anchorages in small bays on the Sinai side, affording shelter from north-easterly winds; the first is 2 miles northward of White cape; the next, North $7\frac{1}{2}$ miles from White cape; the third, N.N.E. about $11\frac{1}{2}$ miles. The distance from White cape to the opposite shore, where there is a small bay with Omeider island in the centre, is 9 miles. There is good anchorage between that island and the mainland, but like all other anchorages except Dahab and Mujawar cove, it is exposed to southerly winds, which sometimes in the winter months, come on suddenly and blow hard for a day or for a few hours.

Tides.—At Omeider it is high water, full and change, at 6 h.; the rise is 4 feet.

Jezirat Faraun or Pharaoh island, about a quarter of a mile long and 300 or 400 yards wide, is in lat. $29^{\circ} 25' N.$, and from the fort and village of Akaba, it bears W.S.W. about 8 miles. The island of Faraun is a barren rock surrounded by an old Saracenic castle, now in ruins, in which are the remains of capacious water tanks; it is about 2 cables from the mainland, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akaba will sometimes bring supplies to this place in five or six hours, but they are not to be trusted.

Akaba is a small Arab village, in an extensive date grove on the eastern shore, nearly at the head of the gulf. Close to the village there is a small square fort, garrisoned by Turkish soldiers. This is a dépôt for grain, for the use of caravans on their way to and from Mecca, and a small supply of provisions may be obtained here. The fort is in lat. $29^{\circ} 29' N.$, long. $35^{\circ} 1' E.$ Near the fort and in the adjacent country are numerous ruins.

Anchorage may be had off Akaba in 11 fathoms, with the fort bearing E.N.E., and distant 2 cables; in southerly winds it is advisable, in order to obtain some shelter from the heavy sea, to be farther south as near as convenient to the point.

From the fort of Akaba, the head of this gulf forms a circular bay, 3 miles to the northward and north-westward, and the same distance across, but abreast of Faraun island, it is about 6 miles wide. The coast at the head of the sea is very low being the end of the sandy valley called Wadi-el-Araba, which is bounded on each side by high mountains.

See chart, No. 8a, and plan, No. 3,047.

Anchorage.—At the head of the gulf, there is good anchorage with protection from northerly winds; in anchoring at this place, it must be recollected that southerly winds bring up a heavy swell.

Water.—Water may always be obtained at the head of the gulf by digging a few feet deep, close to the beach.

TIRÁN ISLAND, in the entrance to the gulf of Akaba, is about 7 miles long by 5 miles wide. On its southern part, near the centre, is a peak 1,670 feet high, in lat. $27^{\circ} 55' N.$, long. $34^{\circ} 34' E.$ a useful mark in entering or leaving the gulf of Suez; the remaining part is a low sandy plain, nearly divided by a long inlet on its north-eastern side. The south-east part of the island is surrounded by a reef, but close off the southern and western sides there are no soundings; the western side is 4 miles distant from the peninsula of Sinai, but the navigable channel into the gulf of Akaba is only about 2 cables in width between the edges of the reefs extending from the north-western and north-eastern sides of Tirán, and those of the coast reefs on both the eastern and western sides. On the south-western part of the latter lies the wreck previously mentioned.

There is no water on Tirán except that left in the holes of the rocks after rain, and it produces nothing but colocynth plants and saline shrubs; it is infested with wild beasts.

Anchorage.—There is anchorage sheltered from all sea on the north-eastern side of the island, with the peak bearing S.W. by W. $\frac{1}{2}$ W.; it is approached by a channel 4 cables wide between the reefs round the east end of the island and the shoal in the centre of the passage between it and Senafir island; the bottom is everywhere rocky and foul.

Senafir, 2 miles eastward of Tirán, is rather a large island of semicircular form, opening into a fine bay on its southern side, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom, but it is open to southerly winds. At the mouth of this bay there is a 5-fathoms bank, and N.E. by E. from its south-west entrance point a rock with less than 2 fathoms over it. Soundings of 15 and 25 fathoms extend some distance southward of the island, but a small shoal, before referred to, exists in the centre of the channel between it and Tirán. Numerous broken peaked limestone hills cover the eastern part of the island, the highest is near its south-eastern end.

The Coast.—From the south-eastern point of entrance to the gulf of Akaba to the harbour of Eynunah, in lat. $28^{\circ} 2' N.$, long. $35^{\circ} 13' E.$, the coast is low and sandy gradually rising from the sea, deeply indented, and fronted by coral reefs, having narrow and intricate channels between them, barely navigable for boats. Between Eynunah and Mowila the patches of reefs are wider apart, and for a considerable extent deep water extends to within a short distance of the shore. In this part, the coast is

backed by lofty mountains, attaining a height at Mowila peak of 9,000 feet. The mountains in this locality are nearer the sea than in other parts, and the land between affords plenty of fire-wood and grazing for sheep.

EYNUNAH.—This harbour, although its approach is formidable from the number of outlying reefs, may, with the assistance of a good pilot, be entered with facility and safety. Towards the interior, at the distance of $1\frac{1}{2}$ miles from the beach, between two barren and rocky hills, is the valley of Eynunah, celebrated among the Bedouins for the purity and abundance of its water. About 2 miles from the beach, a long line of cliffs rises from the plain and forms the outer edge of an extensive tract of table land. The appearance of the luxuriant, though uncultivated, tract contrasts strangely with the wild sterility of the neighbouring scenery. On both sides of the valley are ruins, said to be the remains of a Nazarine or Christian town, and from it, leading to the beach, may be seen an aqueduct by which water was formerly conveyed to a reservoir near the beach. There are still some remains of this work. Jebel Eynunah, 6,090 feet high, bears N. by E. 15 miles from the anchorage.

SHUSHUAH ISLAND lies East 8 miles from Senafir; from its low northern point it gradually increases in height to a bluff 200 feet high at the southern extreme. On some bearings, therefore, the island appears wedge-shaped. The whole island appears to be formed of variegated red and yellow sandstone, mixed with coral. Large masses of the latter, of the madrepore or branched form, so often met with on reefs near the surface, may, when the rain has washed away the soil, be seen embedded in the rocks; and loose broken pieces of the branched kind, besides petrified shells and other marine remains, are thickly strewn over the surface.

The southern side of Shushuah is steep-to, there being no bottom at 50 fathoms; but on the eastern side a small reef projects, off which soundings extend a short distance on which there is anchorage in 7 or 8 fathoms, sandy and rocky bottom.

BARAKAN ISLAND lies E. by S. $\frac{1}{2}$ S. 7 miles from Shushuah, and is divided into two parts connected by a low sandy tract, so that from a distance its two wedge-shaped hills appear as two separate islets. It is about $2\frac{1}{2}$ miles long and 100 feet high. On a near approach, its broken and rugged appearance is very remarkable, large masses which have been detached from the body of the hills lying scattered at their bases. Off its north-western end and eastern side are some patches of sunken rocks; the western and southern sides are safe to approach within a moderate distance, but it is fringed with reef.

Anchorage.—There is good anchorage with sandy bottom close to the south-eastern end of the island, well sheltered from north-westerly

See chart, No. 8a.

winds. There is also anchorage in from 7 to 15 fathoms eastward of the isthmus connecting the two parts of the island; a good berth should be given to the southern part of the island in rounding it for this anchorage, which should not be steered for until the isthmus bears about W. by N. A good look-out from aloft should be kept for coral reefs, as there are many awash in these parts, not shown on the charts. If required, a pilot for Eynunah can generally be obtained at this anchorage.

YUBA ISLAND, its northern end in lat. $27^{\circ} 46' N$, long $35^{\circ} 7\frac{1}{2}' E$, is 2 miles in length north-east and south-east, its northern end being a precipitous cliff 350 feet high, sloping gradually to the south-eastern end. The south-western side is fringed by reef on which are two or three rocky islets, but there are neither soundings nor anchorage near this island. Wyler and Jelajli islands, two low small coral islands, lie 2 or 3 miles eastward of Yuba, and there is also a small reef one mile S.E. from the southern end of Yuba, and another, Shab Pelham, N.N.W. $2\frac{1}{2}$ miles from the northern end, having no soundings near them.

Yuba island is about West 12 miles from Ras Wadi Turiam on the mainland, and between it and the shore are many reefs with deep water between them, and this is the general character of the bight lying inside the islands just described from Tirán south-eastward (*see also* p. 245).

Sila islands are a group of low coral islets which, with the reefs on which they stand, are 7 miles long in a north-west and south-east direction, the southern end being in lat. $27^{\circ} 37' N$, about 12 miles south-eastward of Yuba, and 9 miles W. $\frac{1}{2}$ S. from Mowila.

Between this group and the reef extending off Mowila, there is a narrow channel, but the Sila island reefs extend fully 2 miles eastward and south-eastward of those islets, and, with light winds, no sailing vessel should use it, as there is no anchorage near the Sila islands nor near the reef just mentioned.

MOWILA.—In lat. $27^{\circ} 40' N$, long. $35^{\circ} 29' E$, is the village and fortress of Mowila; it is also a depôt for grain for the Moslem pilgrims. A small Turkish garrison protects the place. The coast in the vicinity is low, gradually rising to hills of great height in the background.

Reefs.—From Mowila, a reef extends W. $\frac{1}{2}$ N. 9 miles, which, at its broadest part, is 3 miles wide. In a south-west direction from Mowila there is a shoal bank of 10 fathoms, and between this and the reef mentioned there is a deep water channel. Another shoal bank, having on it numerous rocky patches, lies in a south-south-west direction from Mowila. It is 10 miles long N.N.W. and S.S.E., and its least distance from the shore is $2\frac{1}{2}$ miles.

Between the last-named reef and the shore is a deep channel, but it is not recommended for a sailing vessel as the reefs have no soundings near the shore. With light winds, a vessel might anchor among the shoal patches on this reef, and temporary anchorage has sometimes been found on the reef, 2 miles westward of Mowila.

Supplies.—From Mowila, excellent sheep and water may be obtained, but the anchorage is unfit for either ship or boat, in addition to which the approaches are very dangerous. Should a vessel require water or other supplies, besides getting good shelter, she should run into Sherm Yahar, presently described, 4 miles S.S.E. from Mowila. There is a caravan route to Medina through Tebuk.

Inhabitants.—The country in this vicinity from Akaba to Nomán island is under the control of three powerful tribes, the Howatat, the Omran, and the Uleggat. Their character is so bad for treachery and ferocity that the Arabs of the *bágalas* will not land upon their coast. The country bordering on the sea coast affords excellent pasture. Between Eynunah and Mowila the Bedouins' huts are numerous, and large flocks of sheep and goats are met with. Their residence, however, is merely temporary; for, should the rain fail them—an event that occurs about once in four years—they retreat from the low countries to their mountains. In this elevated range, of which many hills are above 6,000 feet in height, they possess abundance of water and a never-failing supply of herbage.

Mowila peak.—This remarkable mountain bears E. by S. $\frac{1}{2}$ S. about 14 miles from Mowila, and is a conspicuous object from the sea. The land from the sea-shore near Mowila rises gradually during 6 or 7 miles, when it ascends abruptly to mountains of great height, terminating in the sharp and singular peaks known as mount Mowila. These are in reality very sharp ridges which on some bearings show as peaks, especially from the southward, when they have an irregular columnar appearance with chasms rather than valleys between them. When viewed from the northward most of these peaks are shut in, and mount Mowila then appears as a narrow ridge. It is at the south-eastern extreme of an immense range of high mountains, and its highest point, said to be 9,000 feet high, is in lat. $27^{\circ} 36\frac{1}{2}'$ N., long. $35^{\circ} 45'$ E.

SHERM YAHAR is a small inlet about half a mile deep, 4 miles S.S.E. from Mowila; the entrance is narrow, being only half a cable wide, with from 17 to 10 fathoms in mid-channel; inside, the anchoring space in some places is three-quarters of a cable wide. This small harbour is well sheltered from the prevailing winds, being open to the south-west; the anchorage depths are from 6 to 8 fathoms. On the northern side of the entrance is a pile of stones raised by the Arabs, without which it would be difficult to distinguish it, as the land is low in the vicinity.

See chart, No. 8a, with plan of Sherm Yahar.

Supplies.—Wood and good water, in small quantities, may be procured from the Bedouins, who bring these articles from Mowila and from the interior on camels for sale to the boats that put in here on their passage up and down the coast. Sheep at moderate prices may also be obtained.

SHERM JÚBBA, in lat. $27^{\circ} 33' N.$, $3\frac{1}{2}$ miles south-eastward from Sherm Yahar, is a small inlet about 8 cables long, which affords good anchorage; the entrance channel is very narrow, about half a cable, and the points of the coral reefs from either shore make it very winding. The depths are from 17 and 14 fathoms in the entrance, to 6 or 7 fathoms in a space $1\frac{1}{2}$ cables wide at the head, where there is good and secure anchorage. At $3\frac{1}{2}$ miles from the shore, near Sherm Júbba, is the extensive shoal already mentioned, running nearly parallel with the shore for about 10 miles. Between this shoal and the coast, no bottom was found at 70 fathoms.

The Coast.—From Mowila to Nomán island, the coast has a general S.S.E. direction for about 35 miles, with here and there an occasional small inlet or sherm, affording shelter to the native coasting vessels and boats.

Sherm Zibber and Sherm Kafafa.—Besides Sherms Yahar and Júbba, already noticed, there are Sherm Zibber and Sherm Kafafa. At the former, wood may be procured, and water from some wells near the sea, but the anchorage is bad. At the latter place, the anchorage is also bad; on its southern side is the village of Diba, consisting of a few small houses by the sea-shore and a fort. There is a very fair road from Diba to Mowila, but it ends near the latter place in a defile through which only one camel can pass at a time.

Abreast of these two inlets is a reef which extends N.W. by N. 5 miles, and is $3\frac{1}{2}$ miles from the shore. There is deep water between the rocky heads on the reef, and no soundings at 70 fathoms between the reef and the shore.

NOMÁN ISLAND, of which the northern end is in lat. $27^{\circ} 8' N.$ is 4 miles long in a N.N.W. and S.S.E. direction, and one mile wide; it is low and sandy at the northern end, rising gradually to the southern end where it attains a height of about 400 feet in abrupt red limestone cliffs and hills. These hills are skirted by a few bushes, but are otherwise destitute of vegetation and of a very rugged appearance.

Soundings.—From the northern end of the island, a reef extends N.N.W. $4\frac{1}{2}$ miles nearly, but there are no soundings near it. Between Nomán and Ras Abu Massahrib on the mainland, distant $1\frac{1}{2}$ miles, there is a navigable channel, but care must be taken to avoid several rocky patches in it. The mainland abreast of Nomán and also the land for 7 or

See chart, No. 8a, with plan of Sherm Júbba.

may be obtained in it in 5 or 6 fathoms, sand and coral bottom, with plenty of room for a ship to swing and in close proximity to the coal stores.

Myrmidon shoal, rather interferes with the anchorage of ships of large draught in Perim harbour. On the north-west portion of this shoal there is a least depth of 25 feet, and on the south-east portion of 24 feet, at low water, bottom sand. It is 8 cables in length, north-west and south-east, and 2 to 3 cables across; from its north-west extreme, taking 5 fathoms as the limit, Pirie point lighthouse bears South $3\frac{2}{10}$ cables, and Coal-stacks pier extremity, W. $\frac{5}{8}$ N.

Harbour lights.—In addition to the principal lights of Perim island already described, the following lights are exhibited for the guidance of vessels entering the harbour :—

Murray point.—Two *fixed white* lights on the beacons on this point, visible at the distance of 3 miles. They are respectively 34 and 44 feet above the sea, and 100 yards apart; when in line bearing N. by W. $\frac{1}{8}$ W. they lead into the harbour.

Pirie point.—A *fixed red* light, visible 3 miles, 44 feet above the sea.

Gas buoys.—One off Pirie point, another just within Lee point, bearing from each other N.W. by W. $\frac{5}{8}$ W. and S.E. by E. $\frac{5}{8}$ E. $3\frac{1}{2}$ cables; both show *fixed white* lights. These buoys are painted red and white.

Two *fixed white* lights are also shown *vertically* from the coal company's wharf.

Buoys.—In addition to the two gas buoys at the entrance of the harbour, already described, four can buoys also painted red with white tops, are placed to mark shoals in the harbour, which must all be left on the starboard hand when entering, viz. :—On the south side of the East end of the Nimble shoal of $2\frac{1}{4}$ fathoms; on the south point of a shoal of $2\frac{1}{4}$ fathoms lying about 2 cables west of Nimble shoal; on the south-east side of a $2\frac{1}{4}$ -fathoms extension of the shore reef, which projects one cable south-westward from Murray point; and at three-quarters of a cable south-westward of Nevis point. Four red mooring buoys are placed on the southern side of the harbour, off the piers. There are two cairn beacons on Lee point.

Coal and Supplies.—Welsh coal can be obtained from the stores of the Perim Coal Company and put on board at the maximum rate of 50 to 120 tons per hour. A stock of 8,000 to 10,000 tons is usually kept. There is no liability to interruption of coaling from bad weather. Provisions, stores, ice, and water may be procured; the latter obtained by means of condensers; water is sent alongside in boats, and pumped into the ship at the rate of 40 tons an hour. The services of an extensive

salvage plant, and of European divers can be had at this place, and considerable repairs to ship and machinery can be effected.

Turtle may be caught on the shores of the harbour during the season of the year when the females land to lay their eggs.

Pilots.—By hoisting the usual pilot flag by day, or burning a blue light at night, as soon as Perim high light is well in sight, the attendance of a pilot well outside the harbour is assured; corresponding signals, in answer, are made from the shore.

Directions.—To enter Perim harbour, caution is necessary as the current occasionally sets across the entrance according to the direction of the wind. Bring the lights or beacons on Murray point in line N. by W. $\frac{1}{2}$ W. and steer for them, passing between the light-buoys off Pirie and Lee points; check the ship's way as she passes Pirie point, haul round into the North-west arm, with the flagstaff at the signal station in that arm bearing W.N.W., and anchor as convenient; or proceed to one of the mooring buoys as may be desired or as the harbour-master may direct.

Winds and Weather, &c.—See Appendix, page 481.

TIDES.—It is high water, full and change, at Perim and in the straits generally at 8 h.; springs rise $6\frac{1}{2}$ to $7\frac{3}{4}$ feet, neaps $5\frac{1}{2}$ to $6\frac{1}{4}$ feet. The flood sets N.W., and the ebb S.E. The streams are very irregular both in period and in velocity; sometimes in the centre of the strait there is very little ebb, while at other times, particularly at night, at full and change, it runs at the rate of 4 miles an hour, creating a strong ripple when opposed to the wind. In the channels, the tides greatly depend on the prevailing winds; after a fresh north-wester, the flood will run for 16 hours, and vice versa after a south-easter; the water at the same time ebbing and flowing on the beach with great regularity.

Currents and Tidal streams.—The surface set in the straits of Bab-el-Mandeb is the resultant of the tidal streams and the currents due to wind, and is very variable.

The tidal streams are about $1\frac{1}{2}$ knots at springs; the north-western stream making about 7 hours before superior high water at Aden, and running for 12 hours; for the other 12 hours the tidal stream runs to the south-eastward.

During the period of the strong south-easterly winds, viz., from November to April, the current induced by the wind often overcomes the south-east going stream, and there may be a constant set inwards varying from a quarter of a knot to $3\frac{1}{2}$ knots an hour.

When the stream is running strong into the Red sea there is frequently an eddy to the south-east along the south shore of Perim island.

No observations have yet been obtained during the period of north-westerly winds.

From June to September while the south-west monsoon is blowing in the Indian ocean, the general result of the surface set is out of the Red sea, but during the north-east monsoon, from November to April, into the Red sea. In the straits of Bab-el-Mandeb the current has reached a total amount of 40 miles a day.

From observations made by H.M. surveying vessel *Stork* in January 1898, whilst at anchor in 118 fathoms 7 miles S.W. by W. from Perim island, it would appear that the resultant of the surface current was at that season into the Red sea at an average rate of $1\frac{1}{2}$ knots per hour; but that although the current was generally setting in, its rate was greatly accelerated, or retarded, by tidal influences. From about 8 hours before to 4 hours after the highest high water at Perim, the rate of the current inwards was from $1\frac{1}{2}$ knots to $2\frac{1}{2}$ knots; whilst from 4 hours after, to 8 hours before, the highest high water, the rate of the inward current was from 0 to $1\frac{1}{4}$ knots.

Under-currents.—From observations made for a period of four days, January 19th to 23rd, 1898, by H.M.S. *Stork*, with a view of ascertaining the difference in the set of the lower strata of the water at the entrance of the strait of Bab-el-Mandeb, with reference to that of the upper portion; the following broad result was arrived at:—

There was a permanent current on the surface setting into the Red sea of about $1\frac{1}{2}$ knots per hour.

There was at 105 fathoms depth a permanent current setting outwards of probably the same velocity.

The tidal stream was about $1\frac{1}{4}$ knots at its maximum and flowed for about 12 hours each way, as might be expected from the fact that in this locality there is practically only one tide in the day.

This tidal stream prevails to the bottom, with variations of strength. Somewhere about 75 fathoms is the dividing line between the two permanent currents, but it would require a longer series of observations to determine this point with any precision. Both are influenced by tide.

JEZIRAT SOWABIH, or the BROTHERS, are a group of six rocky islets, immediately outside the Large strait, extending $5\frac{1}{2}$ miles in an east and west direction; the highest or north-eastern islet bears E. by S. $5\frac{1}{2}$ miles from Ras Siyan, and 9 miles S. $\frac{3}{4}$ W. from the southern point of Perim island. The western islet is $2\frac{1}{4}$ miles from the shore, and the eastern islet 7 miles. The channels between them are safe, the depths varying from 6 to 25 fathoms. The tides are rapid and irregular.

The islets are of a brownish colour, the westernmost being volcanic.

See chart. No. 8e.

They are of considerable height, and five of the six may be seen in clear weather from a distance of 20 to 25 miles. The north-eastern islet is 350 feet high, the westernmost 200 feet, and the second from the westward 250 feet. The highest has a conspicuous peak, and on its northern side is a bay which forms an excellent boat-harbour protected from all winds except those between North and East; the bay is abundantly supplied with turtle and various kinds of fish. A low rocky islet to the westward is the only part that may be considered dangerous.

Anchorage may be taken to the southward of the large (N.E.) islet, opposite a small sandy stretch of shore, and near the N.W. Brother.

THE COAST.—The description of the African coast southward of Ras Siyan is continued in Chap. IX., page 354.

See chart, No. 8e.

CHAPTER VI.

EAST COAST OF RED SEA FROM RAS MUHAMMED TO
JIDDA, INCLUDING THE GULF OF AKABA.(Lat. $29^{\circ} 30'$ N. to lat. $21^{\circ} 20'$ N.)

 VARIATION IN 1900.

Ras Muhammed	-	$3^{\circ} 30'$ W.	Jidda	-	-	$2^{\circ} 55'$ W.
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GENERAL REMARKS.—Following the order of construction given on the first page of this work, and having in the preceding chapters completed the description of the western shores of the Red sea and strait of Bab-el-Mandeb, we now return to the northern end of the Red sea, and, starting from Ras Muhammed, proceed to describe the eastern coasts of that sea, the scope of the present chapter including the gulf of Akaba in the North and the port of Jidda in the South.

The eastern coast of the Red sea, which is entirely Arabian, but forming a part of the Turkish empire, is divided at about the parallel of 20° N. into the two provinces of Hedjaz, and Yemen, the former being the northern, the latter the southern province. The part now to be described, therefore, embraces almost the whole littoral of the province of Hedjaz, which province includes within it the sacred cities of Medina and Mecca, the former the burial place of Muhammed, the latter his birthplace.

Aspect.—From the gulf of Akaba to the strait of Bab-el-Mandeb, a distance of 1,000 miles, the Arabian mountains are conspicuous throughout, presenting peaked summits of naked rock from 5,000 to 8,000 feet in height, and varying from 12 to 60 miles in distance from the shore. This range falls so abruptly westward that it presents towards the sea a series of inaccessible cliffs; other, but lower, ranges approach the sea shore in some places, decreasing in height as they advance. In clear weather, these mountains are visible at from 40 to 70 miles, the most remarkable are mount Mowila, the Rudhwa mountains, and Jebel Subh; the others present but little variety.

The higher mountains exhibit formations of gneiss and porphyry in vertical strata, rising above hills of sandstone and gypseous rock. Many of the hills nearer the shore are of limestone, consisting almost entirely of

 See chart, No. 2,523.

a mass of marine fossil remains; those bounding the seashore are of light-coloured sandstone, fronted by and containing large quantities of shells and masses of coral. The extraordinary prevalence of the latter in the Red sea, as was remarked in the first chapter, *see* page 2, is well known; (indeed, its coral reefs are probably as extensive as those found in any part of the world;) it also enters largely into the composition of some of the highest hills.

From the bases of these hills to the shore of the tract between **Ras Muhammed** and **Jidda**, there runs a border of lowland of irregular width, which the Arabs call **Tehama**. It is generally desert and barren; some few spots are cultivated, but they bear so trifling a proportion to the whole as to scarcely need notice. The coast line northward of **Yenbo** is of moderate height, varying from 50 to 100 feet, with no beach. Southward of that port it is more sandy and lower; the inlets and harbours of the former tract may be called coves; in the latter they are lagoons.

Farther southward, from **Yenbo**, to **Jidda**, the coast, consisting of sandbanks with coral bases, is lined with reefs, which run nearly parallel with the shore, with which they are in many places connected. It is very difficult, if not impossible, to distinguish the entrances to the inlets or *sherm*s in this district without the aid of a native pilot. To the natives they compensate in some degree for the deficiency of better anchorages, and they are so situated with respect to each other as to form convenient halting places for the boats and vessels in their progress up and down the sea. In some places there are none, and the Arabs are, under these circumstances, constrained to depend on the precarious shelter afforded by the reefs. The usefulness of these inlets, should small steam-vessels take the route inside the outlying reefs, is evident, and the facilities they afford for procuring fresh water, provisions, and firewood would in such a case be of importance.

The Reefs in this part of the sea are found either extending in ridges, which have generally deep water or no soundings near them, or they form extensive banks, with from 10 to 15 fathoms over them. With some few exceptions, their general direction is straight; though in many places the short projections on either side give them a serpentine appearance. Their length varies from 150 yards to 2 or 3 miles, which they rarely exceed; and it is important to remark that under no condition of wind or weather is a heavy surf to be seen on them; this is probably owing to the coral being more porous on the outer parts of the reefs, and also to its being of the branched variety, by which the force of the sea becomes much reduced.

Inner channel.—The passages inside the numerous reefs lying off the Arabian coast are but little used, except by small native vessels and boats; and, for the reasons given in the remarks on these channels at

See chart, No. 2,523.

page 29, there is no probability of their being frequented by steam-vessels to any appreciable extent in the absence of ports of trade requiring their use.

Winds and Weather in the Inner channel.—At page 116 is given a short outline of the winds usually experienced in the Inner channel on the western side of the Red sea. The winds and weather are very similar on the Arabian side; but the Indian surveying vessels remarked in 1830–1834 that although they experienced land and sea breezes on the Arabian shore more frequently in March and April than on the African side, the land squalls in the southern part of the sea occurred in April and May. From May to July, when they experienced them on the Nubian coast, there was thick hazy weather and heavy dews on the Arabian side opposite; see also remarks on winds, weather, rainfall, &c., in Chap. I., and at the end of the present chapter.

The COAST.—Ras Muhammed has been fully described at page 113. The land leading to the Ras from the high land of the peninsula of Sinai which separates the gulfs of Suez and Akaba, is a long narrow tract nearly divided from the peninsula about 5 miles from the Ras, by the deep bay of Ghazulani on the eastern side. Immediately northward of this, a range of mountains takes its rise and extends nearly the whole length of the peninsula; the general height of these mountains is from 3,000 to 5,000 feet, and during the winter months the summits of the highest are frequently covered with snow.

From the narrow neck described, near Ras Muhammed, to the entrance of the gulf of Akaba, the coast is high and precipitous, having no soundings near the shore.

Sherm Sheikh and Sherm ul Moiya.—About 8 miles northward from Ras Muhammed are the two small harbours, Sherm Sheikh and Sherm ul Moiya, separated from each other by a rocky tongue of land 50 to 70 feet in height. The western, Sherm Sheikh, which derives its name from the tomb of a sheikh, at the eastern extreme of the bay, is the more capacious and has a wider entrance than the other. It affords good anchorage abreast the tomb at about $1\frac{1}{2}$ cables from the shore, in a depth of about 11 fathoms, sand, but care must be exercised in taking a berth as the bank drops abruptly into deep water.

The narrow entrance to the completely sheltered inner basin of Sherm ul Moiya is so obstructed by coral banks, that a ship drawing more than 10 feet can only make its way through these obstacles with the greatest caution, and there is no anchorage outside them. There are wells in Sherm ul Moiya containing but little water, and that brackish; they are situated on the western side of the bay about 150 yards from the shore.

See chart, No. 757, and plan, No. 3,047.

From this place, Mount Sinai may be reached in $2\frac{1}{2}$ days by a comparatively good road.

In this locality, when it is blowing hard from N.N.W. out of the gulf of Suez and N.N.E. out of the gulf of Akaba, the winds meet, coming in gusts, and changing in a few seconds, from both quarters. Still, a sailing-vessel with perseverance, can get to an anchor by keeping well to windward, and then running along shore. From these harbours, the Bedouin Arabs of 'Tor are always on the look-out, eager and happy to convey letters or passengers from here to Suez or Cairo. They are civil and attentive, and may be freely trusted; in four days they take letters to Suez. Between Ras Muhammed and these harbours there is no anchorage on the coast; the mountains are close to the sea and present a grand range extending N.N.E. and N.N.W., from 3,000 to 5,000 feet high.

The GULF of AKABA, has a general N.N.E. direction for 98 miles, with a breadth varying from 7 to 14 miles; the shores are closely bounded by mountainous ridges, mostly of granite, which continue to preserve the same direction far beyond the head of the gulf, and are said to terminate on the borders of the Dead sea; in many places they rise from the plain like a wall, and the passes over them are extremely difficult. Where sandy points occur on the shores of the gulf, they are all caused by torrents at times washing the sand out of the larger valleys.

The mountainous district on the eastern side of the gulf of Akaba is inhabited by two strong tribes, the Omran and Howatat, who are perfectly distinct from each other but closely connected by alliance. By the Arabs of the seaport towns, these tribes are held in great detestation, the Arabs whenever obliged to anchor on their coast are careful to select such spots as are out of their reach.

During the greater part of the year, N.N.E. winds blow with great fury down the gulf of Akaba, but in April and May they are generally more moderate, and an occasional change to a southerly wind occurs in that period, which makes it the most favourable time for an ascent of the gulf by a sailing vessel.

Captain Moresby, who surveyed the gulf of Akaba in 1833, remarks:—

“In this part of the Red sea the winds are drawn to the southward by very high ranges of mountains, bounding closely both sides of the gulf, and opening like a funnel to the northward in Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence that the wind raises the sea into a deep and turbulent swell; the place is almost void of soundings and anchorages, except in a few spots hereafter mentioned.

“Native vessels do not navigate the gulf of Akaba, and they dread crossing the Red sea near its entrance. Many vessels have been lost in

the gulf, and very heavy weather was experienced by the *Palinurus* during the survey."

H.M.S. *Gannet*, visiting the gulf for a week at the end of August 1894, found northerly winds of light to moderate force, and late Egyptian reports tend to show that better weather than that experienced in 1833 not unfrequently prevails.

Soundings.—The depths in the gulf of Akaba are greater than those in the gulf of Suez, no bottom being found at 130 fathoms in the former; the shores are steep-to. The bottom of the gulf of Akaba is a continuation of the valley in which lie the Dead sea and river Jordan, both of which are much below the level of the Mediterranean.

Strait of Tirán.—The entrance of the gulf of Akaba is nearly closed by the island of Tirán with its extensive reefs. The strait of Tirán is the passage on the western side of that island; it is 4 miles wide, and there are 70 fathoms within a mile of Ras Nuzerani on the western side. Reefs project to the westward from Tirán island towards the coast reef, extending half a mile from Ras Nuzerani, leaving a narrow channel only about 2 cables in width between the edges of these dangers. The wreck of the Turkish steamer *Gedikler*, nearly high and dry, lies (1896) on the south-western part of the reef, extending westward from Tirán. Through this channel the wind and swell come down with great violence. There is also a passage north-eastward of Tirán, from $3\frac{1}{2}$ miles to a quarter of a mile wide; and, notwithstanding the numerous and extensive reefs in it, this is the best and safest channel for a sailing vessel, as there is anchorage throughout as far as Ras Fartak, the eastern point of entrance to the gulf on the mainland.

ANCHORAGES.—For the convenience of those navigating the gulf of Akaba, the descriptions of the anchorages affording shelter in case of need are now given in the order in which they come on either hand as a vessel proceeds northward.

Ras Fartak.—Southward of Ras Fartak there is good anchorage, and here a vessel may remain until the wind allows her to proceed up the gulf, which at this point, in lat. $28^{\circ} 6' N.$, is $6\frac{1}{2}$ miles wide; it then widens considerably. The first anchorage above Ras Fartak is on the eastern shore, in Sherm Mujawar, a snug cove with a narrow entrance, between 6 and 7 miles from Ras Fartak; south of the land-spit in the middle of the harbour the depth is $2\frac{1}{2}$ fathoms. Five miles farther, good anchorage will be found in Sherm Dhaba. From this, there is no anchorage on the eastern side until Bir-al-Mashiya, presently described, in lat. $28^{\circ} 51\frac{1}{2}' N.$

Mersa Dahab, or the Golden Port, probably the Eziongeber of the Bible, is on the westward side of the gulf, in lat. $28^{\circ} 28' N.$, long. $34^{\circ} 30' E.$, and is distant $32\frac{1}{2}$ miles from the peak on Tirán island,

See chart, No. 8a, and plan, No. 3,047.

and E. by S. $\frac{3}{8}$ S. nearly 29 miles from mount Sinai. This port is formed by a sandy point extending eastward from the line of coast nearly 2 miles, and then turning first southward and then westward; on the outer extreme of the point is a large date grove; among the trees, indifferent water may be found in some wells. The date grove is inhabited during the fruit season, but the Turwari Arabs return before the winter months for pasture in the valleys of the immense mountains in the dreary peninsula of Sinai.

Within the flat land-spit which encloses the small harbour, is a perfectly sheltered little anchorage, with good holding ground. Also, outside the land-spit, westward of the point, there is good anchorage in about 8 fathoms, but the ground in the vicinity is rocky and uneven. A reef projects S.S.W. $3\frac{1}{4}$ cables from the outer or south-east end of the land-spit, which is quite covered at high water.

Ras Arser.—The next anchorage is on the same side about 10 miles N.N.E. of Dahab, under the lee of the sandy point Ras Arser. A bluff point called Windy cape projects out to seaward, but there is no anchorage there.

Wasit, where good anchorage may be obtained during northerly winds, is a low sandy point 13 miles N.N.E. from Ras Arser.

Bir-al-Mashiya, is a temporary anchorage on the eastern side of the gulf in lat $28^{\circ} 51\frac{1}{2}'$ N., and E. by N. 10 miles from Wasit; it is 8 or 10 miles northward of a bluff headland which bounds the view on the eastern side of the gulf, from a vessel either in the northern or southern part of it. The anchorage is under a sandy point in 5 or 6 fathoms, well protected from northerly winds, or farther eastward in 12 fathoms at $1\frac{1}{2}$ cables from the shore; the depth increases very rapidly to seaward. A small patch of rocks surrounds this point and extends a little to seaward, but there is deep water a mile from the shore.

Nawibi, another low sandy point on the Sinai side with a large grove of date trees on it, is 7 miles northward of Wasit, and about 10 miles north-westward of Bir-al-Mashiya; it is in lat. $28^{\circ} 57'$ N. This spot affords good shelter from northerly winds, in $7\frac{1}{2}$ fathoms, coral and sand; indifferent water may be obtained among the date trees, where there are some wells. There are some coral banks, with less than 2 feet water over them, in the western part of the roadstead, with 5 fathoms close to, the anchorage is otherwise clear. There is a frontier fort at about 3 miles north of the anchorage at Nawibi, with a small Egyptian garrison, which can be seen at the distance of 5 miles; a palm grove fringes the shore to the southward.

Abu Ramlah, the northern point of a small bay about 12 miles above Nawibi on the same side, is the next anchorage, and is sheltered from

northerly winds. It is in lat. $29^{\circ} 8' N.$, and its position may be known by that of White cape, a white patch or sand-drift on the lower hills, $2\frac{1}{2}$ miles N.N.E. of the point.

Between White cape and Jezirat Faraun or Pharaoh island, near the head of the gulf, there are three more anchorages in small bays on the Sinai side, affording shelter from north-easterly winds; the first is 2 miles northward of White cape; the next, North $7\frac{1}{2}$ miles from White cape; the third, N.N.E. about $11\frac{1}{2}$ miles. The distance from White cape to the opposite shore, where there is a small bay with Omeider island in the centre, is 9 miles. There is good anchorage between that island and the mainland, but like all other anchorages except Dahab and Mujawar cove, it is exposed to southerly winds, which sometimes in the winter months, come on suddenly and blow hard for a day or for a few hours.

Tides.—At Omeider it is high water, full and change, at 6 h.; the rise is 4 feet.

Jezirat Faraun or Pharaoh island, about a quarter of a mile long and 300 or 400 yards wide, is in lat. $29^{\circ} 25' N.$, and from the fort and village of Akaba, it bears W.S.W. about 8 miles. The island of Faraun is a barren rock surrounded by an old Saracenic castle, now in ruins, in which are the remains of capacious water tanks; it is about 2 cables from the mainland, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akaba will sometimes bring supplies to this place in five or six hours, but they are not to be trusted.

Akaba is a small Arab village, in an extensive date grove on the eastern shore, nearly at the head of the gulf. Close to the village there is a small square fort, garrisoned by Turkish soldiers. This is a dépôt for grain, for the use of caravans on their way to and from Mecca, and a small supply of provisions may be obtained here. The fort is in lat. $29^{\circ} 29' N.$, long. $35^{\circ} 1' E.$ Near the fort and in the adjacent country are numerous ruins.

Anchorage may be had off Akaba in 11 fathoms, with the fort bearing E.N.E., and distant 2 cables; in southerly winds it is advisable, in order to obtain some shelter from the heavy sea, to be farther south as near as convenient to the point.

From the fort of Akaba, the head of this gulf forms a circular bay, 3 miles to the northward and north-westward, and the same distance across, but abreast of Faraun island, it is about 6 miles wide. The coast at the head of the sea is very low being the end of the sandy valley called Wadi-el-Araba, which is bounded on each side by high mountains.

Anchorage.—At the head of the gulf, there is good anchorage with protection from northerly winds; in anchoring at this place, it must be recollected that southerly winds bring up a heavy swell.

Water.—Water may always be obtained at the head of the gulf by digging a few feet deep, close to the beach.

TIRÁN ISLAND, in the entrance to the gulf of Akaba, is about 7 miles long by 5 miles wide. On its southern part, near the centre, is a peak 1,670 feet high, in lat. $27^{\circ} 55' N.$, long. $34^{\circ} 34' E.$ a useful mark in entering or leaving the gulf of Suez; the remaining part is a low sandy plain, nearly divided by a long inlet on its north-eastern side. The south-east part of the island is surrounded by a reef, but close off the southern and western sides there are no soundings; the western side is 4 miles distant from the peninsula of Sinai, but the navigable channel into the gulf of Akaba is only about 2 cables in width between the edges of the reefs extending from the north-western and north-eastern sides of Tirán, and those of the coast reefs on both the eastern and western sides. On the south-western part of the latter lies the wreck previously mentioned.

There is no water on Tirán except that left in the holes of the rocks after rain, and it produces nothing but colocynth plants and saline shrubs; it is infested with wild beasts.

Anchorage.—There is anchorage sheltered from all sea on the north-eastern side of the island, with the peak bearing S.W. by W. $\frac{1}{2}$ W.; it is approached by a channel 4 cables wide between the reefs round the east end of the island and the shoal in the centre of the passage between it and Senafir island; the bottom is everywhere rocky and foul.

Senafir, 2 miles eastward of Tirán, is rather a large island of semicircular form, opening into a fine bay on its southern side, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom, but it is open to southerly winds. At the mouth of this bay there is a 5-fathoms bank, and N.E. by E. from its south-west entrance point a rock with less than 2 fathoms over it. Soundings of 15 and 25 fathoms extend some distance southward of the island, but a small shoal, before referred to, exists in the centre of the channel between it and Tirán. Numerous broken peaked limestone hills cover the eastern part of the island, the highest is near its south-eastern end.

The Coast.—From the south-eastern point of entrance to the gulf of Akaba to the harbour of Eynunah, in lat. $28^{\circ} 2' N.$, long. $35^{\circ} 13' E.$, the coast is low and sandy gradually rising from the sea, deeply indented, and fronted by coral reefs, having narrow and intricate channels between them, barely navigable for boats. Between Eynunah and Mowila the patches of reefs are wider apart, and for a considerable extent deep water extends to within a short distance of the shore. In this part, the coast is

backed by lofty mountains, attaining a height at Mowila peak of 9,000 feet. The mountains in this locality are nearer the sea than in other parts, and the land between affords plenty of fire-wood and grazing for sheep.

EYNUNAH.—This harbour, although its approach is formidable from the number of outlying reefs, may, with the assistance of a good pilot, be entered with facility and safety. Towards the interior, at the distance of $1\frac{1}{2}$ miles from the beach, between two barren and rocky hills, is the valley of Eynunah, celebrated among the Bedouins for the purity and abundance of its water. About 2 miles from the beach, a long line of cliffs rises from the plain and forms the outer edge of an extensive tract of table land. The appearance of the luxuriant, though uncultivated, tract contrasts strangely with the wild sterility of the neighbouring scenery. On both sides of the valley are ruins, said to be the remains of a Nazarine or Christian town, and from it, leading to the beach, may be seen an aqueduct by which water was formerly conveyed to a reservoir near the beach. There are still some remains of this work. Jebel Eynunah, 6,090 feet high, bears N. by E. 15 miles from the anchorage.

SHUSHUAH ISLAND lies East 8 miles from Senafir; from its low northern point it gradually increases in height to a bluff 200 feet high at the southern extreme. On some bearings, therefore, the island appears wedge-shaped. The whole island appears to be formed of variegated red and yellow sandstone, mixed with coral. Large masses of the latter, of the madrepore or branched form, so often met with on reefs near the surface, may, when the rain has washed away the soil, be seen embedded in the rocks; and loose broken pieces of the branched kind, besides petrified shells and other marine remains, are thickly strewed over the surface.

The southern side of Shushuah is steep-to, there being no bottom at 50 fathoms; but on the eastern side a small reef projects, off which soundings extend a short distance on which there is anchorage in 7 or 8 fathoms, sandy and rocky bottom.

BARAKAN ISLAND lies E. by S. $\frac{1}{2}$ S. 7 miles from Shushuah, and is divided into two parts connected by a low sandy tract, so that from a distance its two wedge-shaped hills appear as two separate islets. It is about $2\frac{1}{2}$ miles long and 100 feet high. On a near approach, its broken and rugged appearance is very remarkable, large masses which have been detached from the body of the hills lying scattered at their bases. Off its north-western end and eastern side are some patches of sunken rocks; the western and southern sides are safe to approach within a moderate distance, but it is fringed with reef.

Anchorage.—There is good anchorage with sandy bottom close to the south-eastern end of the island, well sheltered from north-westerly

winds. There is also anchorage in from 7 to 15 fathoms eastward of the isthmus connecting the two parts of the island; a good berth should be given to the southern part of the island in rounding it for this anchorage, which should not be steered for until the isthmus bears about W. by N. A good look-out from aloft should be kept for coral reefs, as there are many awash in these parts, not shown on the charts. If required, a pilot for Eynunah can generally be obtained at this anchorage.

YUBA ISLAND, its northern end in lat. $27^{\circ} 46' N$, long $35^{\circ} 7\frac{1}{2}' E$, is 2 miles in length north-east and south-east, its northern end being a precipitous cliff 350 feet high, sloping gradually to the south-eastern end. The south-western side is fringed by reef on which are two or three rocky islets, but there are neither soundings nor anchorage near this island. Wyler and Jelajli islands, two low small coral islands, lie 2 or 3 miles eastward of Yuba, and there is also a small reef one mile S.E. from the southern end of Yuba, and another, Shab Pelham, N.N.W. $2\frac{1}{2}$ miles from the northern end, having no soundings near them.

Yuba island is about West 12 miles from Ras Wadi Turiam on the mainland, and between it and the shore are many reefs with deep water between them, and this is the general character of the bight lying inside the islands just described from Tirán south-eastward (*see also* p. 245).

Sila islands are a group of low coral islets which, with the reefs on which they stand, are 7 miles long in a north-west and south-east direction, the southern end being in lat. $27^{\circ} 37' N$., about 12 miles south-eastward of Yuba, and 9 miles W. $\frac{3}{4}$ S. from Mowila.

Between this group and the reef extending off Mowila, there is a narrow channel, but the Sila island reefs extend fully 2 miles eastward and south-eastward of those islets, and, with light winds, no sailing vessel should use it, as there is no anchorage near the Sila islands nor near the reef just mentioned.

MOWILA.—In lat. $27^{\circ} 40' N$., long. $35^{\circ} 29' E$., is the village and fortress of Mowila; it is also a depôt for grain for the Moslem pilgrims. A small Turkish garrison protects the place. The coast in the vicinity is low, gradually rising to hills of great height in the background.

Reefs.—From Mowila, a reef extends W. $\frac{1}{2}$ N. 9 miles, which, at its broadest part, is 3 miles wide. In a south-west direction from Mowila there is a shoal bank of 10 fathoms, and between this and the reef mentioned there is a deep water channel. Another shoal bank, having on it numerous rocky patches, lies in a south-south-west direction from Mowila. It is 10 miles long N.N.W. and S.S.E., and its least distance from the shore is $2\frac{1}{2}$ miles.

Between the last-named reef and the shore is a deep channel, but it is not recommended for a sailing vessel as the reefs have no soundings near the shore. With light winds, a vessel might anchor among the shoal patches on this reef, and temporary anchorage has sometimes been found on the reef, 2 miles westward of Mowila.

Supplies.—From Mowila, excellent sheep and water may be obtained, but the anchorage is unfit for either ship or boat, in addition to which the approaches are very dangerous. Should a vessel require water or other supplies, besides getting good shelter, she should run into Sherm Yahar, presently described, 4 miles S.S.E. from Mowila. There is a caravan route to Medina through Tebuk.

Inhabitants.—The country in this vicinity from Akaba to Nomán island is under the control of three powerful tribes, the Howatat, the Omran, and the Uleggat. Their character is so bad for treachery and ferocity that the Arabs of the *bágalas* will not land upon their coast. The country bordering on the sea coast affords excellent pasture. Between Eynunah and Mowila the Bedouins' huts are numerous, and large flocks of sheep and goats are met with. Their residence, however, is merely temporary; for, should the rain fail them—an event that occurs about once in four years—they retreat from the low countries to their mountains. In this elevated range, of which many hills are above 6,000 feet in height, they possess abundance of water and a never-failing supply of herbage.

Mowila peak.—This remarkable mountain bears E. by S. $\frac{1}{2}$ S. about 14 miles from Mowila, and is a conspicuous object from the sea. The land from the sea-shore near Mowila rises gradually during 6 or 7 miles, when it ascends abruptly to mountains of great height, terminating in the sharp and singular peaks known as mount Mowila. These are in reality very sharp ridges which on some bearings show as peaks, especially from the southward, when they have an irregular columnar appearance with chasms rather than valleys between them. When viewed from the northward most of these peaks are shut in, and mount Mowila then appears as a narrow ridge. It is at the south-eastern extreme of an immense range of high mountains, and its highest point, said to be 9,000 feet high, is in lat. $27^{\circ} 36\frac{1}{2}'$ N., long. $35^{\circ} 45'$ E.

SHERM YAHAR is a small inlet about half a mile deep, 4 miles S.S.E. from Mowila; the entrance is narrow, being only half a cable wide, with from 17 to 10 fathoms in mid-channel; inside, the anchoring space in some places is three-quarters of a cable wide. This small harbour is well sheltered from the prevailing winds, being open to the south-west; the anchorage depths are from 6 to 8 fathoms. On the northern side of the entrance is a pile of stones raised by the Arabs, without which it would be difficult to distinguish it, as the land is low in the vicinity.

See chart, No. 8a, with plan of Sherm Yahar.

Supplies.—Wood and good water, in small quantities, may be procured from the Bedouins, who bring these articles from Mowila and from the interior on camels for sale to the boats that put in here on their passage up and down the coast. Sheep at moderate prices may also be obtained.

SHERM JÚBBA, in lat. $27^{\circ} 33' N.$, $3\frac{1}{2}$ miles south-eastward from Sherm Yahar, is a small inlet about 8 cables long, which affords good anchorage; the entrance channel is very narrow, about half a cable, and the points of the coral reefs from either shore make it very winding. The depths are from 17 and 14 fathoms in the entrance, to 6 or 7 fathoms in a space $1\frac{1}{2}$ cables wide at the head, where there is good and secure anchorage. At $3\frac{1}{2}$ miles from the shore, near Sherm Júbba, is the extensive shoal already mentioned, running nearly parallel with the shore for about 10 miles. Between this shoal and the coast, no bottom was found at 70 fathoms.

The Coast.—From Mowila to Nomán island, the coast has a general S.S.E. direction for about 35 miles, with here and there an occasional small inlet or sherm, affording shelter to the native coasting vessels and boats.

Sherm Zibber and Sherm Kafafa.—Besides Sherms Yahar and Júbba, already noticed, there are Sherm Zibber and Sherm Kafafa. At the former, wood may be procured, and water from some wells near the sea, but the anchorage is bad. At the latter place, the anchorage is also bad; on its southern side is the village of Diba, consisting of a few small houses by the sea-shore and a fort. There is a very fair road from Diba to Mowila, but it ends near the latter place in a defile through which only one camel can pass at a time.

Abreast of these two inlets is a reef which extends N.W. by N. 5 miles, and is $3\frac{1}{2}$ miles from the shore. There is deep water between the rocky heads on the reef, and no soundings at 70 fathoms between the reef and the shore.

NOMÁN ISLAND, of which the northern end is in lat. $27^{\circ} 8' N.$ is 4 miles long in a N.N.W. and S.S.E. direction, and one mile wide; it is low and sandy at the northern end, rising gradually to the southern end where it attains a height of about 400 feet in abrupt red limestone cliffs and hills. These hills are skirted by a few bushes, but are otherwise destitute of vegetation and of a very rugged appearance.

Soundings.—From the northern end of the island, a reef extends N.N.W. $4\frac{1}{2}$ miles nearly, but there are no soundings near it. Between Nomán and Ras Abu Massahrib on the mainland, distant $1\frac{1}{2}$ miles, there is a navigable channel, but care must be taken to avoid several rocky patches in it. The mainland abreast of Nomán and also the land for 7 or

See chart, No. 8a, with plan of Sherm Júbba.

8 miles northward of it, nearly as far as Diba, is skirted by a reef, which extends in some place $1\frac{1}{2}$ miles from the shore; at $4\frac{1}{2}$ miles from Diba there is a detached head at nearly $2\frac{1}{2}$ miles from the coast.

Anchorage.—There is good, though limited, anchorage in 5 to 8 fathoms, coral, in Sherm en Nomán, a small bay about the middle of the east side of the island. It affords shelter in all winds, as the shores of the bay, from 80 to 100 feet high, drop almost perpendicularly to the sea. In the winter time Bedouins from the mainland settle here bringing their camels and sheep for pasture. Though there is an anchorage near the north end of the island it is not recommended. A low woody point on the mainland, about the south end of the island, affords good shelter from strong north-westerly winds.

Supplies.—The natives on the mainland are civil and bring sheep and water for sale, but Europeans should be cautious not to go far inland.

The Coast from 7 miles northward of Nomán island to 30 miles southward of it as far as Sherm Dumeigh, is skirted by a reef having deep water close to its edge. Farther south, as far as the vicinity of Sherm Munnaiburra, there is no coast reef except for 3 or 4 miles on either side of Ras Morabit; but, in the offing, between Nomán and Sherm Habbán, large patches of coral reef exist at distances from the shore varying from 2 to 8 miles. Between these clusters of reefs there exist deep-water channels, and on the shoal banks are several low sandy islands where vessels may find anchorage; but these reefs should not be approached too closely without the assistance of a native pilot, unless some previous experience of anchoring among reefs has been gained.

The coast is partly fronted with steep overhanging cliffs of coral and sandstone, from the base of which to the distance of about 40 yards there extends a level band of rocks, the outer part of which is nearly dry and rises like a wall from an almost unfathomable depth. Against this the sea, meeting with a resistance so abrupt, breaks with some violence and produces a considerable surf, which renders landing on the intermediate coast between the shermus almost impracticable.

About 10 miles inland, in lat. $26^{\circ} 33' N.$, long. $36^{\circ} 27' E.$, is Jebel Antar, a conspicuous mountain 3,733 feet high; on its centre are two small peaks, by which it is easily recognized from the sea. Between Nomán and Wej, a number of low hills extend close down to the coral cliffs lining the shore.

Sherm Jezza, in lat. $26^{\circ} 57' N.$, is a small inlet where sheep may be obtained, but the anchorage is bad. The country in the vicinity is remarkably barren and destitute of vegetation; a stratum of black stone on the surface of the hills and plains gives the whole a bleak and desolate appearance.

Shab Massawik, the northern extreme of a cluster of rocky patches running nearly parallel with the shore for 32 miles, lies W. $\frac{1}{2}$ N. 8 miles from Sherm Jezza.

Soundings.—There are no soundings under 65 fathoms between Shab Massawik and the shore except a small patch of 12 fathoms; but between the Shab and Nomán island, soundings extend a mile off-shore, where a vessel may, in moderate weather, anchor. To the southward, on the shoal bank indicated, the depths vary from a few feet to 60 fathoms.

Mersa Zobaida is rather a larger inlet, about 5 miles S.E. of Sherm Jezza, but the anchoring ground is bad, although well sheltered. Firewood is plentiful here.

Nabakiya is a small, low, sandy island, covered with bushes, and surrounded by a reef, lying nearly on the centre of the shoal bank about 32 miles long, before described. The island is in lat. $26^{\circ} 43' N.$, long. $36^{\circ} 1' E.$, and on its south-eastern side there is good anchorage.

Uweindiya is another low sandy island, about 300 yards long and 100 yards wide, on the same long bank as Nabakiya and near the extreme of a reef extending about 6 miles north-westward from it. Between this island and Nabakiya, N.N.W. 8 miles from it, there are numerous rocky patches with deep water between. A reef extends one mile from the south-eastern end of Uweindiya, and there are numerous off-lying reefs westward and southward of it for the distance, respectively, of 2 and 3 miles. S.E. by S. 4 miles from Uweindiya is a rocky patch, the outer one of those extending in that direction from this island. There is good anchorage on the eastern side of Uweindiya.

SHERM DUMEIGH, a small bay in lat. $26^{\circ} 39' N.$, with an entrance about one cable wide, open to the south-westward, and with no bottom at 30 fathoms in mid-channel, is about 4 cables deep, and 5 cables wide. The available anchoring space is small, the width between the 5-fathoms line of soundings, inshore of which the water shoals rapidly, being only a cable, and the extreme length of the sheltered part 3 cables. The entrance is between Twigg and South points, both of which have fringing reefs steep to.

The anchorage is secure in from 9 to 13 fathoms, with good holding ground, soft sand and coral; and well sheltered, the western side of the harbour being land-locked. In the north-western corner, the deep water extends to within 50 yards of the beach; but, both on the north-eastern and south-western sides, shallow water extends some distance off; and, in the centre of the harbour facing the entrance, are some dangerous shallow coral patches. Just within South point is a lagoon separated from the harbour by a reef connecting South point with East bluff, which reef dries at low water.

With the exception of a few scrub bushes, there is no vegetation, nor any signs of habitation, nor is there any water. The nearest village is 6 miles distant, which contained when visited about the year 1833, about 40 people who were unwilling to part with provisions of any kind.

Directions.—Commander W. H. C. Selby, H.M.S. *Vestal*, 1878, from whose remarks and survey the preceding description is derived, gives the following directions :—

In approaching the sherm either from the north or south, keep well off-shore outside all danger, until Jebel Antar bears E. by N. $\frac{1}{2}$ N. On this bearing will be seen also four or five remarkable pyramid-shaped sand-hills near the beach, southward of Jebel Antar. Steer for the mountain on this bearing until within a mile of the shore, and from thence to the northward for the entrance of the sherm, which may easily be recognised by a remarkable hill with a rugged peak, named Punch's cap; see view on plan. Steer for this hill on a N.E. course until Mark rock, a conspicuous white rock on the beach within the harbour, is seen. With the hill and Mark rock in line (bearing N.E.), proceed slowly as the entrance is neared, until North rock is just open to the left of Ass's Ears N. $\frac{1}{2}$ E.; then alter course sharply to port, and keep about half a cable distant from the shore on the port hand. East bluff bearing S.E. $\frac{1}{4}$ E. astern leads clear of the shoals on either side.

Vessels entering for the first time should send a boat ahead and mark the channel, in order to avoid the steep and dangerous patches near the centre of the harbour, and the shoal ground extending some distance eastward from the shore northward of Twigg point. The best time to enter is either when the sun is high or when it is astern; and, at low water, when the reefs are distinctly visible.

Tides.—The rise and fall observed from 5th to 12th July (full moon on 14th) was $2\frac{1}{2}$ feet.

Sherm Antar, nearly 4 miles S. by E. $\frac{1}{2}$ E. from Sherm Dumeigh, has good anchorage but is inferior to the latter sherm in that respect.

Anchorage.—Good anchorage may be found on the eastern side of a shoal and rocky bank, in lat. $26^{\circ} 25' N.$, long. $36^{\circ} 15' E.$, which extends 5 miles in a S.S.E. direction at a distance of 3 miles from the mainland. The bank is about 2 miles wide.

SHERM WEJ, in lat. $26^{\circ} 13' N.$, is a small bay harbour bordered by a reef. The coast in this vicinity is composed of coral cliffs from 50 to 70 feet high, and between these and the hills, which are steep and about 3 or 4 miles inland, there is a low plain, which is marshy near the sea and covered with a saline incrustation. The bay is about 3 cables in length in a north-easterly direction, and rectangular in shape, with an

See plan, No. 14, and plan of Sherm Wej on chart, No. 86.

entrance 250 yards wide between the reefs; it is easy of access and no dangers bar the approaches. A few stone houses forming the village of Wej are on the northern side of the bay, and 100 yards to the eastward is a fort which is a good mark for a ship entering the sherm; as is also a tower, 50 feet high, on the south side of the bay, which is visible seaward at the distance of 8 miles. The island of Raikha, distant 5 miles S.W. by W. $\frac{1}{2}$ W. is an excellent mark for making the harbour.

About 6 miles eastward of Wej is a fort nearly surrounded by hills, with a small garrison of Turkish soldiers; this fort serves as a depôt for grain for the use of caravans going to Mecca. The natives who occupy this tract of country are of the Bili tribe; those near the coast are said to be civil, and gain a subsistence by supplying the Hajj or pilgrim boats with fresh provisions and water. The fishermen who reside here belong to the Huteimi tribe, members of which are found all over the Red sea. The number of pilgrims who pass through Wej annually is said to be very great.

Anchorage.—There is good but confined anchorage in Sherm Wej, two thirds of the bay being occupied by reefs and shallow water. The best anchorage is in from $3\frac{1}{2}$ to 6 fathoms. A large vessel should moor head and stern close inside the northern point of the bay, where the bottom is of stiff clay; she is then clear of the swell which rolls across the entrance, and safe against a shift of wind to the southward and south-eastward which is often very sudden. Only small vessels have room to swing. The water shoals gradually towards the shore and towards the head of the bay. The tide rises about a foot.

Supplies.—At Sherm Wej, water is scarce and brackish. Adequate machinery to condense 6,000 gallons a day, has, however, been erected, to supply the want formerly felt. Should a large ship require water at Wej, and not like the anchorage, she may anchor southward of the reef extending eastward from Raikha island, distant 4 or 5 miles from Wej, at which place boats can be procured to bring water. There are some wells about 6 miles inland near the fort before mentioned. Sheep may be obtained at from one to one and a half dollars a head.

Sherm Habbán, in lat. $26^{\circ} 5' N.$, long. $36^{\circ} 33' E.$, and 9 miles S.S.E. of Sherm Wej, affords good anchorage in $4\frac{1}{2}$ fathoms, sand and mud, with shelter from all winds, being completely landlocked, with room for three or four small vessels. Near, but inside the entrance, there are several rocky patches easily distinguished by the discoloration of the water; these project from the south-eastern shore and narrow the passage to half a cable.

Supplies.—Excellent water, firewood, and sheep may be obtained at Sherm Habbán at a cheap rate from the Bedouin Arabs.

See chart No. 86, and plan, No. 3,047.

Raikha island bears S.W. by W. $\frac{1}{2}$ W. 5 miles from Sherm Wej, and is the north-western island of a group on a shoal and rocky bank 10 miles in length between Sherm Wej and Sherm Habbán. Between this bank and the shore, there is a good and safe channel one mile wide at its narrowest part. Raikha is low and rocky, gradually rising from its southern end to a height of 50 feet in the middle and at the northern end. There is good anchorage in from 10 to 12 fathoms southward of the reef connecting Raikha with some islets eastward of it.

Mardúna island is on the southern extreme of the shoal bank just mentioned, and is 8 miles S.E. $\frac{1}{2}$ S. from Raikha; it is three-quarters of a mile long N.N.W. and S.S.E., and in some places is only 100 or 50 feet wide; it is remarkable for its appearance and formation, being in fact a narrow ridge of coral in detached pointed masses, which vary in height from 200 to 300 feet and afford shelter to numerous flocks of wild pigeons which breed on the island.

Tides.—At Mardúna it is high water, full and change, at 6 h.; the rise is 3 feet.

RAS KURKUMA.—From Sherm Habbán, the coast trends eastward 4 or 5 miles, and from thence southward, forming the bay of which Ras Kurkuma, 400 feet high and gradually rising to its centre, is the southern horn. In the middle of this bay, 2 to 3 miles off-shore, is a reef 5 miles long north and south, and inshore of the reef is a channel of 20 fathoms and upwards. The shore in the bay is low and sandy, and in some parts is pointed by low coral cliffs.

Anchorage.—Eastward of Sherm Habbán, 4 or 5 miles distant, is Sherm Munnaiburra, in the north-eastern angle of the bay; good anchorage in from 30 to 15 fathoms, with protection from north-westerly winds, may be found near the shore in this locality. Sheep, firewood, and excellent water, may be obtained at this anchorage.

The Coast from Ras Kurkuma to Ras Abu-Mad is much indented, and fronted by a group of low sandy islets and reefs, connected with each other by an extensive bank of soundings studded with numerous isolated rocks. There are channels between them used by boats, but no ship should venture to navigate amongst them.

Sheikh Mirbat island, 3 miles W. $\frac{1}{2}$ N. from Ras Kurkuma, is a low coral islet surrounded by a reef; midway between it and the cape, there is a rocky patch of considerable extent. This island is famous among the Arabs, by whom it is much visited, as containing the tomb of Sheikh Mirbat, an old priest who lived here for about 70 years.

The island is safe to approach; a bank of soundings of from 50 to 30 fathoms extends 3 miles westward of it, and also N.N.W. with from 25 to 12 fathoms joining the rocky island Mardúna.

Anchorage.—There is good anchorage close to the southward of Sheikh Mirbat, leading into a channel amongst the reefs.

Howar, Umuruma, and Masabi.—Howar is a small, low, sandy islet. Umuruma is a low sandy islet, covered with bushes, about $5\frac{1}{2}$ miles long N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E. Masabi is a low and level coral island from 18 to 20 feet high, with coral cliffs fronting its western side; it is $5\frac{1}{2}$ miles long N.N.W. and S.S.E., and $1\frac{3}{4}$ miles wide; its western side is quite steep, having no soundings at 120 fathoms close to the cliffs, and there are no outlying dangers westward of it. All these islands are on an extensive horse-shoe reef, whose northern end closely approaches Sheikh Mirbat island, and its southern end is close to the north-western end of another extensive reef. Masabi is on the outer part of this horse-shoe reef, and its northern end bears S.S.W. $\frac{1}{2}$ W. 14 miles from Sheikh Mirbat.

Anchorage.—The reef extending south-eastward from Masabi has in it a gap about 2 miles from the island. In this gap a vessel may anchor with shelter from the sea but the bottom is very foul.

Sheibara island.—Close to the south-eastern extreme of the reef on which Masabi island stands, is another extensive reef which has a length of 18 miles in a S.E. $\frac{1}{2}$ S. direction, and Sheibara is on the south-eastern extreme of it; its southern end is in lat. $25^{\circ} 22'$ N. This island is low, sandy, and of coral formation, having numerous bushes on it; its length is about 6 miles and its width 2 miles.

A reef lies S.W. $6\frac{1}{2}$ miles from the north-western point of Sheibara; and between Sheibara and the north-western extreme of the reef on which it stands, there are numerous small coral islets.

Reef.—About 2 miles from the south-eastern end of Masabi, commences a serpentine reef which maintains a general south-south-easterly direction for about 12 miles and is from 15 to 20 miles distant from the nearest points on the shore. There are no dangers or soundings westward of the reef; between it and the adjacent reef eastward of it, there are from 10 to 20 fathoms.

Anchorage.—There is good anchorage and shelter on the eastern side of the southern point of the reef just mentioned.

Woghadi is a small coral island 3 miles S.E. from Sheibara; it lies on a shoal and coral bank of the horse-shoe shape, in the bight of which and under the southern side of the island, there is good anchorage.

Outer reefs.—From 4 to 7 miles S.W. by W. from the western point of Woghadi are three clusters of reefs arranged in a horse-shoe shape 14 miles from the nearest land; there are no soundings near them.

Between these reefs and the island Hassani, nearly 20 miles farther south-eastward, there are numerous rocky patches.

Channel.—Between Sheibara and Woghadi, there is a channel leading into a gap amongst the inner reefs, and from thence amongst the reefs to the northward. It is used by most of the native boats but is much too narrow and dangerous for a ship, although the *Palinurus* passed through it twice.

Anchorage.—In the inner channel amongst the reefs from Ras Kurkuma to Woghadi island there is good anchorage throughout, but no ship should pass inside the reefs in this locality except for the purpose of picking up a temporary anchorage.

HASSANI ISLAND, the centre or high part of which is in lat. $24^{\circ} 58' N.$, long. $37^{\circ} 3' E.$, is $4\frac{1}{2}$ miles in length north-west and south-east, and about 2 miles wide. The island is 400 feet high at the centre and northern end, but slopes gradually down to a low southern point; it can be seen from the deck of a ship 25 miles distant in clear weather. It is about 9 miles to the mainland abreast of it, which here forms a deep bay to the eastward, in which are several reefs and two small islands. Northward of Hassani, distant 4 miles, a long reef is connected with that from the northern end of the island. These reefs together extend 15 miles in a N.N.E. direction, in broken patches, rocks, and sand-banks, with narrow and dangerous channels between them.

At 6 miles S.W. $\frac{1}{4}$ W. from the centre of Hassani island, there is a small reef having no soundings near it; and, 8 miles W.N.W. from the same point in the island, there is another small reef, which is the most western shoal of several that lie off the western side of Hassani.

Anchorage.—There is spacious anchorage near the south-eastern end of Hassani in 10 or 15 fathoms; but care must be observed not to haul too close round the south-western side, as there is an extensive reef and sunken rocks running off from the south-western point to the southward and south-eastward for about $1\frac{1}{2}$ miles. The best anchorage is round the south-eastern point, under the eastern side of the island, close to a large Arab village inhabited for some months in the year by people from the mainland. The anchorage abreast of the village affords shelter from all winds. From this anchorage, the small islet Umm Sahr, surrounded by a reef, lies E.S.E. about 3 miles, and Maliha islet N.E. $1\frac{1}{2}$ miles.

Supplies.—A scanty supply of sheep, wood, and water can be obtained from the Arabs, who bring supplies from the mainland, which in this part is rich in pasture and dates; but it is necessary to observe great caution in transactions with the natives. During the winter season, indifferent water may also be obtained at Hassani island, in small quantities,

from some wells near a sheikh's tomb ; brackish water can be had by digging a few feet in the sand.

During the warm season, the Arabs leave the coast for this island both to avoid the great heat of the continent, and to dispose of their grain, dates, &c, to the pilgrim boats which put in here. Abundance of fish can be obtained.

Tides.—It is high water, full and change, at Hassani island at 6 h.

Libna is a small rocky island, 300 feet high, half a mile distant from the western side of Hassani. The channel between is full of rocks and only fit for boats.

The Coast.—From the part abreast of Hassani island, as far southward as Ras Mahar, the land fronting the sea is low and sandy in some places, but higher and rocky in others ; from thence, it gradually rises to 100 or 200 feet, at which height it forms an extensive table-land. The face of this slope is intersected by numerous traces of torrents, which have divided and rent it in a very remarkable manner. The back range of mountains, about 15 miles from the sea, takes the same direction as the coast and is of irregular height, varying from 1,500 to 2,000 feet : it is broken into detached hills of a pyramidal form, diverging to a considerable width.

RAS ABU-MAD is the low sandy extreme of the promontory of Abu-Mad and is in lat. $24^{\circ} 51' N.$, long. $37^{\circ} 7\frac{1}{2}' E.$; between this and Hassani island, distant 7 miles N.N.W., there are extensive rocky patches which bound on the southern and south-eastern sides the anchorage inside Hassani. At $1\frac{1}{4}$ miles westward of Ras Abu-Mad there is a shoal and rocky bank extending N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E. about 4 miles.

Shab Ma Mubarak is a small shoal 5 miles S.W. $\frac{1}{2}$ W. from Ras Abu-Mad and is the outer shoal off this point ; on its south-eastern side, between it and Abu Matari, there is anchoring ground.

The promontory of Abu-Mad is skirted by reef as far southward as Sherm Habbán, a small anchorage half way between Ras Abu-Mad and Ras Mahar.

Ras Mahar, a low rocky point, is the commencement of the tract of table-land before mentioned, extending to the southward ; it is about 80 feet high, the upper part overhanging the base very considerably. It has a small patch of rocks extending off it, under which native boats sometimes seek a precarious shelter from strong southerly breezes ; but as these winds often shift to the northward, suddenly and without warning, it is never used except in case of necessity. A short distance southward of Ras Mahar there is another similar bluff, but about 80 feet higher.

See chart, No. 86.

Abu Matari is a group of large and small reefs on the western side of a shoal bank of soundings extending 5 miles S.E. by S. and N.W. by N., its northern end being 5 miles S.W. by S. from Ras Abu-Mad, and leaving a narrow channel between it and Shab Ma Mubàrak on its north-western side. Between its southern end and Ras Mahar, distant 2 miles, there is a deep channel; and on the eastern and south-eastern sides of Abu Matari there is anchorage for a small ship. There are no soundings on the western side of these reefs.

Nearly due South from the centre of Abu Matari, and separated by a channel 2 miles wide, is a shoal bank with another cluster of reefs 3 miles long N.N.W. and S.S.E. A rocky patch detached from this bank bears East $1\frac{1}{2}$ miles from the southernmost reef of the group.

Sherm Mahar.—The interior of this inlet, which is 3 miles from Ras Mahar in a south-easterly direction, is not very extensive, yet the entrance is capacious and affords a facility of egress which is rarely met with in other inlets along the eastern coast. Moderately high table-lands approach close to the sea; a remarkable gap in them, forming a deep valley, points out the sherm. This valley, which is very extensive, spreads out to a considerable width as it advances into the interior; the lower part is covered with bushes, and along it, about a mile from the beach, are some straggling palm trees. The valley presents an extraordinary appearance, not unlike the dry bed of a river; the upper part of the hills or banks on either side overhang very considerably, and many large fragments, detached during the course of time, lie scattered in the valley.

There is good anchorage in Sherm Mahar in 7 fathoms, sandy bottom, for a ship of any size, with shelter from north-westerly winds. Sheep are to be obtained from the Bedouins, but water is scarce.

Sherm Hassey is 4 miles south-eastward of Sherm Mahar; the outer anchorage, lying in a north and south direction, is not recommended, as the space is contracted, the depth of water great, and the bottom foul; but the inner part of the Sherm turns to the north-eastward and forms a small basin $1\frac{1}{2}$ cables in diameter with from 5 to 7 fathoms water. The northern half of the Sherm is choked by reefs, as is also nearly half of the eastern part of the remaining portion, leaving a passage to the inner basin only about two-thirds of a cable in width. About a mile from the beach there are some wells, but the water is of very indifferent quality, and, in consequence, the Bedouins do not remain in this locality; but, when boats are detained here for two or three days by contrary winds, the Arabs having observed their arrival from the hills, frequently bring sheep, water, and other supplies for sale.

PALINURUS REEFS or Shab Shoaiba are a group of small reefs about 4 miles in extent, having neither soundings nor anchorages

See chart, No. 86, with plan of Sherm Hassey.

near them. The north-western reef is in lat. $24^{\circ} 29' N.$, long. $37^{\circ} 9' E.$, the nearest point of the coast from this position being $11\frac{1}{2}$ miles distant; W. by N. 4 miles from the reef, and 15 miles from the nearest land, is a detached patch, and several patches lie south-westward, the outermost being nearly 3 miles distant. Being at so great a distance from the shore these reefs are dangerous for a ship to approach at night. On the southern end of the large reef there is a rock above water, about the size of a ship's capstan. A good mark for these reefs is, Scragged hill on with the northern brow of Rudhwa mountains.

Shoals.—A group of shoal patches on a shoal and rocky bank, commences from a position $2\frac{1}{2}$ miles S.W. by W. from Sherm Hassey and runs nearly parallel with the shore for 15 miles; from its outer edge, the shore is distant 4 or 5 miles. There is good anchorage inside the large reef near the northern end of this bank, and amongst the reefs generally are to be found anchorages of an indifferent kind.

Shab Kurush or **Shark reef**, is detached from the southern extreme of the shoal and rocky bank just described. From the nearest point of Palinurus reef, Shark reef is distant 9 miles in a S.E. direction; and lies 4 miles W. by S. $\frac{3}{4}$ S. from the nearest point of the mainland.

CAPE BARIDI is a moderately high promontory forming a convex curve to the westward about 7 miles in breadth; there are several points in this curve, all having different native names. The shore is bounded by steep coral cliffs, having no soundings close to them. Inland, northward and eastward of cape Baridi, is a remarkable range of broken hills of moderate height, and, more distant, the lofty Rudhwa mountains all of which are presently described.

The Coast.—Ras Jerboa bears E. $\frac{1}{4}$ S. 11 miles from cape Baridi; at 7 miles from the latter, the coast falls back to the northward forming a deep bay 4 miles wide, encumbered by reefs and islets; Ras Jerboa, the south-eastern point of this bay, is low and sandy, as is the shore generally from thence to Yenbo, a distance of 22 miles, the trend of the coast line being about S.E. $\frac{1}{2}$ E. During the whole of this distance the shore is skirted by a reef about one mile wide, broken only at Sherm Yenbo, 8 miles north-westward of Yenbo.

MOUNTAINS.—**Rudhwa range**, E. by N. $\frac{1}{2}$ N. 44 miles from cape Baridi and rising 6,000 feet above the sea, is the highest point of this remarkable range of table mountains. From Yenbo, its north-western brow bears N. by E. $\frac{3}{4}$ E. 30 miles. Between this range and the shore is a group of dark-coloured hills, generally about 500 feet high, the valleys between which are filled with light-coloured sand, apparently drifted by the strong westerly winds from the surrounding desert.

Sugar-loaf and Scragged hill.—The Sugar-loaf, the westernmost hill of any prominence as viewed from cape Baridi, bears N. by E. $\frac{1}{4}$ E. 17 miles from that cape; Scragged hill, 9 miles E.S.E. from the Sugar-loaf, bears N.E. 18 miles from the same cape: and, Cliff hill, is seen between them. These hills are very conspicuous from a ship nearing the shore and are seen under the high land north-eastward of them, which is part of the range of mountains extending from the neighbourhood of Yenbo as far north-westward as inland of Hassani island; in the centre of the range is one higher than the rest called Round mountain, in lat. $24^{\circ} 43' N.$, long. $37^{\circ} 55' E.$

Anchorage.—There is anchorage eastward of the reefs off Ras Jerboa, between them and some small islands which lie across the mouth of the bay before described, of which Ras Jerboa is the southern boundary. The *Palinurus* anchored inside these islands, and at that time (1834) the native pilots were well acquainted with that part of the coast. The anchorages are generally met with at about 200 yards inside any of the islets, which are in fact merely ridges and labyrinths of reefs, connected by an extensive bank of soundings.

Care is required in approaching the coast hereabouts, as detached rocks lie near the shore for several miles south-eastward of Ras Jerboa; whilst in the offing they lie in broken patches from the western shore of the bay round to the bearing of South from Ras Jerboa at from 5 to 7 miles from that cape. The shore reef on the eastern side of the bay extends upwards of $1\frac{1}{2}$ miles off-shore, and there are several outlying patches. A stranger should not attempt this anchorage without the assistance of a native pilot.

Sherm Yenbo, 24 miles E.S.E. from cape Baridi and in lat. $24^{\circ} 10' N.$, is a capacious inlet, incomparably the best harbour on the coast between Ras Muhammed and Jidda, being easy of ingress and egress for sailing vessels. The inlet consists of three arms, of which the northern and longest extends 5 miles inland.

Depths.—There are 20 fathoms at the entrance, decreasing to 10 and 8 fathoms a short distance in; so that a vessel becalmed outside might anchor at the entrance, and this is an advantage possessed by few other shermes. Sailing vessels, apprehensive of entering this sherm, may anchor outside, and obtain supplies from Yenbo either by land or boat.

Schermo reef.—There is a rocky patch named Schermo, 6 miles S.W. by S. from the entrance of Sherm Yenbo, and S.S.E. 3 miles from it is another patch both of which must be avoided. There are no soundings between these patches and the shore.

YENBO, the port of entry for Medina, the burial-place of Muhammed, is governed by a Turkish Effendi and has a garrison of about 500 men.

See chart, No. 86.

It stands on a low sandy shore destitute of vegetation, on the northern side, and half-a-mile within the entrance, of an inlet of the sea. The high houses and mosque may be seen at the distance of about 13 miles; the approach to the harbour is not dangerous. The entrance is in lat. $24^{\circ} 5' N.$ and 8 miles S.E. from Sherm Yenbo. Cattle and water may be obtained and are both cheap and good.

Entrance.—Depths.—The entrance is about $1\frac{1}{2}$ cables wide between the reefs. There are no soundings just outside, but in the entrance they decrease rapidly from 15 to 8 and 6 fathoms; off the town the anchorage is in from $3\frac{1}{2}$ to 6 fathoms and the width of the anchorage ground is $1\frac{1}{4}$ cables. A reef forms the southern side of the harbour; and, from the opposite side, a tongue of reef extends off into mid-channel in a south-westerly direction from the southern part of the town, so that although the harbour apparently opens out considerably within the entrance, its navigable capacity remains about the same, and the south-eastern side has to be kept aboard to avoid this tongue.

There is a conspicuous white tomb on the low sandy point forming the northern side of the harbour, and a small sandy island, covered with bushes, having a sheikh's tomb near its eastern end, on the broad bank of the reef forming the southern side.

From the influx and departure of pilgrims to and from Medina, the population of Yenbo is constantly fluctuating, but the number of actual residents in 1835 was estimated at 2,000, including the Turkish garrison. Its commerce is of minor importance compared with that of Jidda, but within the last few years a considerable share of the trade of central Arabia has been absorbed at Yenbo, the natural port for Medina and Nejd, and the harbour is now visited by Egyptian, British, Turkish, and Austrian steamers. The place is in telegraphic communication with Medina and Jidda. There are about 1,500 houses occupying a space of considerable extent, and formerly enclosed by a loop-holed wall, now in ruins; many of the houses, being built of coral, are rapidly falling into decay. The inhabitants are mostly Arabs of the Joheinah tribe.

The revenue of Yenbo is derived exclusively from the customs, which are nominally fixed at 10 per cent. The imports consist of articles required for the consumption of Medina and the northern ports of Hedjaz, and are mostly grain, coffee, and articles of dress.

Directions.—A sailing vessel can only enter this harbour with a fair wind. The reefs are easily seen if the light is favourable, and a vessel may run for Yenbo after 9 a.m., as the sun is then high enough to render them visible. A patch of rocks, on which the south-eastern swell breaks very heavily, bounds the southern side of the entrance and extends a little

See chart, No. 8b, with plan of Yenbo.

distance to the N.W., making the harbour difficult to quit when north-westerly winds have been blowing; and the land wind in the morning is scarcely sufficient to carry a vessel out against the swell. A vessel is, therefore, in danger of being drifted on the rocks, should the land wind fail and the boats be unable to tow her against the swell.

It is proposed to erect an iron framework beacon on Scherm reef, to be 16 feet in height, and surmounted by a cone.

Anchorage.—The best anchorage in Yenbo is nearly abreast of the landing-place for pilgrims, in from $3\frac{1}{2}$ to 4 fathoms water, the bottom being a sort of muddy sand, and very good holding ground, the anchor sinking gradually to a considerable depth.

Kabriya reef lies S.W. $\frac{1}{2}$ W. 4 miles from the entrance of Yenbo, and is about $1\frac{1}{2}$ miles long by one mile wide. From its centre, a small patch of rocks bears E. by N. $\frac{1}{4}$ N. $2\frac{3}{4}$ miles, and another small patch N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles. Between these reefs and the mainland there is deep water, as also between Kabriya reef and its outlying patches.

The Coast.—From Yenbo to Sherm Bureika, 38 miles farther south-eastward, the coast is low, marshy and thickly overrun with mangrove trees. Yenbo is principally supplied with firewood from this tract; beyond it, the country continues low for a considerable distance, and, as it recedes from the shore, appears to be composed of a fine light sand, which has filled up the valleys and blown up the sea faces of the numerous hills that rise in sharp conical peaks. Though several of these are from 500 to 1,000 feet high, yet the sand has collected in such prodigious quantities as to reach the summit of the highest, leaving in many places the upper parts of the black peaks discernible, and from thence descending in a solid mass with a moderate inclination to the plain.

From Yenbo to Sherm Bureika, the coast is skirted by a reef having occasional breaks, in which Bágals or native boats find shelter and anchorage at night. From Kabriya reef, there extends a bank of soundings in a south-easterly direction for 26 miles, which has on it numerous rocky patches, the outer ones being upwards of 9 miles from the nearest part of the shore. Between these patches there is deep water, and also an in-shore passage between the eastern shoals and the coast reef.

Shab Sabah, or the **Seven reefs**.—The northern shoal of this group, in lat. $23^{\circ} 53' N.$, long. $37^{\circ} 54' E.$, lies S.W. by S. 14 miles from Yenbo. They occupy a space about 9 miles long in a S.E. by S. direction and about 2 miles wide, and are about 18 miles from the nearest land. There are no soundings close westward of them.

Thetis, or **Mansi reef** is a small and dangerous rock showing three heads, the most elevated of which is about 6 feet above high water;

See chart, No. 86.

it lies S. by E. 8 miles from the southernmost of the Sabah reefs, and W.S.W. 23 miles from Ras Majiz, on the mainland. There are no soundings at 120 fathoms very near it.

Shab Sufiani.—S.E. $\frac{3}{4}$ E. 12 miles from the Thetis reef is the north-western edge of Shab Sufiani, a narrow reef about $2\frac{1}{2}$ miles long in a S.E. by S. direction. Its centre bears W. by S. $\frac{1}{2}$ S. $16\frac{1}{2}$ miles from Sherm Bureika. There is very deep water close to it.

Ras Majiz.—Anchorage.—There is good anchorage in a bight of the coast reef southward of this cape, which is 26 miles south-eastward of Yenbo.

Reef.—About 4 miles S.W. $\frac{1}{2}$ S. from Ras Majiz is the north-eastern extreme of an extensive shoal and rocky bank, 17 miles long north and south, and 7 or 8 miles wide. Between this bank and the coast reef, there is a channel from 2 to 3 miles wide, and nearly in the centre of this passage is Sherm Bureika. The rocky patches on this bank are very numerous; they have soundings and indifferent anchorages amongst them, but no soundings on their outer edge, which is about 5 miles inshore of Shab Sufiani.

Sherm Bureika, in lat. $23^{\circ} 37' N.$ and bearing S.E. $\frac{1}{2}$ S. 38 miles from Yenbo, has a narrow entrance not more than 50 yards wide, but, as the water in the channel is perfectly smooth and the rocks on either side rise perpendicularly, the passage is not attended with danger. From this narrow gut the interior spreads out into an excellent harbour of sufficient extent to afford anchorage in 3 or 4 fathoms, for five or six ships. With the exception of a narrow boat channel on the northern side, the upper part of this sherm is choked by an extensive flat, dry at low water. This boat channel leads to a low point on which are the ruins of a fortified town as large as Yenbo.

Supplies may be obtained here, but the natives are not to be trusted; in fact the whole tract of country from Ras Hatiba to this place is inhabited by the Harb Bedouins, a tribe whose character is proverbial throughout the Red sea for ferocity and treachery, so that it is dangerous to land on this coast.

Ras el Abyad, 5 miles S. by E. $\frac{1}{2}$ E. from the entrance of Sherm Bureika, is a low sandy point; there is a rocky patch 3 miles W.S.W. from it. Ras el Abyad is skirted by a reef wider here than in the adjacent parts.

Mersa Sabir.—Eastward of Ras el Abyad, the coast forms the bight called Mersa Sabir, about 5 miles across, bounded by reefs, but affording safe, commodious, and extensive anchorage, capable of receiving many vessels.

Coast reef.—From Ras el Abyad, the coast reef continues as far as Sherm el Kharrar, where it terminates after having fringed the shore for upwards of 120 miles without any important break in it. For a distance of over 30 miles between Ras el Abyad and the low sandy point Ras Mastura, shoal and rocky patches lie off the coast reef at distances varying from 4 to 7 miles from the shore. Close to the edge of the shoal bank on which these patches lie, there are no soundings at 30 fathoms.

KHARRAR REEFS.—The northern extreme of these reefs is in lat. $23^{\circ} 5' N.$, long. $38^{\circ} 41' E.$; they are on a shoal bank, extending from thence 18 miles in a $S. \frac{1}{2} E.$ direction, and are formed principally of large clusters of reefs, having passages of moderate depth between. The outer rocks are 9 or 10 miles from the shore, and between the eastern side of the group and the shore, there is a channel from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles wide, having no bottom at 30 or 40 fathoms.

Jebel Subh is a remarkable mountain 17 miles from the sea, and about 4,500 feet high; it is the highest land between Jidda and Yenbo, and can be seen at about 40 miles. The upper part forms a convex line with two small peaks near the centre; they are in lat. $23^{\circ} 18' N.$, long. $39^{\circ} 2' E.$ A range of very high land extends some distance N.N.E. of Subh, and has several remarkable peaks on it; but these are seldom seen far at sea unless the atmosphere is very clear. The summit of Jebel Subh is the stronghold of a fierce and warlike race of Bedouins, the Beni Subh (a branch of the great Harb tribe), who inhabit its fastnesses and are divided into smaller clans.

Sherm Rabegh, in lat. $22^{\circ} 44' N.$, long. $39^{\circ} 0' E.$, is an inlet about 2 miles long, affording excellent anchorage inside its entrance in from 8 to 12 fathoms, perfectly sheltered from all winds and easy of ingress and egress to sailing vessels when north-westerly winds are blowing. In the entrance are from 18 to 20 fathoms, and, immediately outside, no bottom with 30 fathoms. Rabegh is a sacred spot to Mussulman pilgrims, who here disrobe and put on the white garb of pilgrims.

At Rabegh, wood, water, and other supplies may be obtained at a cheap rate, but the Bedouin Arabs are not to be implicitly trusted. An extensive date grove and several villages are situated about 5 miles inland.

Jebel Rahab.—In the interior of the country there is a range of mountains, of which the most conspicuous and nearest is Jebel Rahab, a double bluff hill with precipitous sides; it is in lat. $22^{\circ} 32' N.$, long. $39^{\circ} 25' E.$

Shab el Abyad.—About 10 miles West from Sherm Rabegh is the eastern end of this large reef, about 3 miles in extent N.W. by W. and S E. by E., and having no soundings near it at 30 and 40 fathoms.

See chart, No. 8b, with plan of Sherm Rabegh.

Shab el Khamsa.—At 9 miles W.N.W. from the north-western end of Shab el Abyad are four small shoals lying close together, called Shab el Khamsa; they are in lat. $22^{\circ} 47' N.$ and long. $38^{\circ} 37' E.$; there is no bottom at 40 fathoms close to the eastward of them. At 3 miles E. by N. from them, and in line with the southern end of the Kharrar reefs, there is a rocky patch with no bottom near it at 50 fathoms.

Reefs.—From Sherm Rabegh, a shoal and rocky bank, having on it numerous reefs with passages and anchorages amongst them, extends S. by W. $\frac{1}{4}$ W. 24 miles, where it ends in Shab Nazar, on the north-eastern side of which is indifferent anchorage. The western edge of this bank preserves nearly a straight line, and there are no soundings outside it at 40 or 50 fathoms. The bank of reefs is from 2 to 5 miles wide; its north-eastern part is about $1\frac{1}{4}$ miles from the shore, a little southward of the entrance to Sherm Rabegh; westward of Ras Malak and off Ras el Khurmá, the inshore channel is 5 miles wide. There is a rocky shoal about mid-channel off Ras el Khurmá, but in all other parts no bottom at 40 and 50 fathoms. There is also a patch about 2 miles S.E. from Shab Nazar.

Abu Sahim shoal.—A little westward of the northern end of the large bank of reefs just described, is the Abu Sahim shoal in lat. $22^{\circ} 38' N.$, long. $38^{\circ} 54' E.$, under which there is good anchorage during north-westerly winds.

Mersa Dheneb, 8 miles S.S.E. from Sherm Rabegh, has good anchorage in from 7 to 10 fathoms. All this part of the coast is a low sandy desert.

The Coast.—Between Ras el Khurmá and Ras Malak, both of which points are low and sandy, there is a deep bight full of shoals. From Ras Malak, the coast takes a S.W. by S. direction for 21 miles to Ras Hatiba, and between them are various mersas or anchorages of considerable extent, but very difficult of approach on account of the numerous reefs and shoals with which all this part of the coast is bordered, and which extend from 6 to 8 miles off-shore; there are, however, some channels among them, which will be better understood by reference to the chart than by following a description of them. From Ras Hatiba, the coast continues low and sandy, the high land in the background presenting nothing remarkable in appearance.

Haramil island bears W.S.W. 7 miles from Ras Malak; it is a sandy islet about 200 yards long, covered with bushes, and about 10 or 12 feet high; it is merely an accumulation of drift on the upper ridge of a reef, and can be seen about 8 miles distant. The northern extreme of the shoal and rocky bank on which it stands is distant from the island 5 miles in a N. by W. direction. Westward of the island there is a long reef

extending north and south about 6 miles, and separated from Haramil by a channel $1\frac{1}{2}$ miles wide. Nearly opposite this island on the mainland is the Bedouin village Tuwal, containing about 200 inhabitants who subsist by fishing and collecting pearls. Of the latter, however, the northern part of the Red sea furnishes but a scanty supply, inferior both in size and quality to those obtained from the extensive banks in the Persian gulf.

Aikah is a small, low, sandy island, almost enclosed by reefs, and lying N.N.E. 3 miles from Ras Hatiba.

Sherm Ubhur is an inlet about 8 miles in length. The entrance, about 15 miles N.N.W. of Jidda, is in lat. $21^{\circ} 42' N.$; it is narrow, varying in width from three-quarters of a cable to $2\frac{1}{2}$ cables for some distance, when it widens out into some beautiful bays; at the head of the Sherm is a marsh extending several miles into the interior.

The anchorage is on the northern bank, about half-a-mile within the entrance, and about one cable inside a rocky point, which should be rounded as near as the patch running off it will admit; with the exception of this point, the extreme end of which may be easily discerned, the passage inside, as well as the shore about the entrance, is free from dangers. This anchorage, however, is not recommended for a sailing vessel as it is difficult to quit with a light land wind if there is any swell at the entrance, which is generally the case after strong north-westerly winds. In other respects, a vessel may lie quite landlocked inside, with scarcely room to swing, except in the upper part.

ELIZA REEFS.—These extensive reefs are a continuation of the group extending southward from Ras Malak, and from abreast of Ras Hatiba. They occupy a space about 28 miles in length north and south, by an extreme width of 11 miles. There is a deep Inner channel between the bank on which they stand and the shore; and close to the western side of the bank for its whole length, there is no bottom with 70 fathoms of line. At the southern and south-western edges of the bank, and at intervals along its western and north-western side, are breaking reefs of which the most important are presently described.

Inner channel.—If a good look-out is kept, a ship from the northward may with safety take advantage of the Inner channel between the Eliza reefs and the low sandy shore fronting them. It is from one to 3 miles wide, with no bottom at 60 and 70 fathoms, and both sides are steep-to. Should night come on before a ship is through, she may haul a little to the westward and anchor as convenient under the lee of any of the reefs, bearing in mind that the range of reefs on the western side of this channel on which anchorage may be had, terminates in lat. $21^{\circ} 46' N.$; in which position, the Sisters, two remarkable hills with peaks elevated 1,900 and 2,070 feet, and the northernmost high lands near the shore in

See chart, No. 8c.

this part, bear about East or E. by S. Southward of this for 6 miles, there are only a few patches which do not afford good shelter from north-westerly winds.

The northern entrance to the channel is close past the south-western end of Abu Madafi, the north-westernmost of the Eliza reefs. An E. by S. $\frac{1}{2}$ S. course for 8 miles, with soundings of from 40 to 10 fathoms, leads into the Inner channel; a course may then be steered close along shore to the reefs off Jidda.

Abu Madafi is at the north-western extreme of the Eliza reefs; its western extreme bears W. by N. $11\frac{1}{2}$ miles from Ras Hatiba; it is about 4 miles long in a N.E. by E. $\frac{1}{2}$ E. direction, and very narrow. There is good anchorage under the south-eastern side of the reef, with shelter from north-westerly winds.

Katah Dukeis is a large patch of reefs on the western side of the Inner channel just mentioned, having deep water close-to. Its northern end bears W. $\frac{1}{2}$ S. 6 miles from Ras Hatiba.

A reef on which the British steamship *Arethusa* stranded in 1879 is reported to exist within the western boundary of the Eliza shoals in lat. $21^{\circ} 58\frac{1}{2}'$ N., long. $38^{\circ} 45'$ E., bearing S.S.E. $\frac{1}{2}$ E. 3 miles from the south-western extreme of Abu Madafi, and N. by E. 6 miles from Abu Faramish.

Abu Faramish.—At $12\frac{1}{2}$ miles S.W. by W. from Ras Hatiba, and also within the western edge of the bank on which the Eliza shoals lie, is the northern extreme of this shoal, which is narrow and about $2\frac{1}{2}$ miles long in a S.S.W. $\frac{1}{2}$ W. direction. There is good anchorage near its centre on the eastern side.

Shab el Kebir.—Beacon.—This reef, at the south-western extreme of the Eliza shoals, is about 3 miles long. N.N.W. and S.S.E., and is marked near its centre by an iron column, 30 feet in height, surmounted by a ball, 6 feet in diameter and painted red; this beacon should be seen in clear weather from a distance of 8 miles. It is proposed to establish a petroleum light on Shab el Kebir. The beacon is in lat. $21^{\circ} 40\frac{1}{2}'$ N., long. $38^{\circ} 50'$ E., and, from it, the entrance to Sherm Ubhur bears E. $\frac{1}{4}$ N. 14 miles, and El Harig, the principal entrance channel to the port of Jidda, S.E. 21 miles. From Shab el Kebir, extensive breaking reefs lie in a N. by W. direction, and also to the south-eastward, having deep water between and amongst them.

From Sherm Ubhur, the coast trends about South 11 miles to Ras Gahaz, the northern extreme of the bay of Jidda, of which Ras al Aswad, 10 miles farther South, is the southern boundary. This bay is filled and fronted by reefs with navigable channels between them. Amongst them are the anchorages and inner harbour of Jidda; the town of Jidda, now to be described, lying on the sea-shore in the north-eastern part of the bay.

JIDDA, in lat. $21^{\circ} 28'$ N., long. $39^{\circ} 11'$ E., is the port of Mecca, which is distant inland from Jidda 60 miles in an E. $\frac{1}{2}$ S. direction; it is one of the most considerable places on the shore of the Red sea, and is in the province of Hedjaz. The town stands in a low, sandy, and extensive plain, in front of a range of hills 10 miles distant from the sea, the land farther in the interior being considerably higher and mountainous.

The town, with its white minarets, has an imposing effect from the sea; it is half a mile square, and enclosed by a wall, with small towers at intervals, the angles towards the sea being commanded by two forts. In the northern fort is the prison; the southern fort consists of two octagons joined, and in the northern octagon is the flag-staff.*

There are three entrances to the town on the sea side, of which the southern is the principal, and leads into the main bazaar. The northern gate is the most convenient for communication with the consulates but is seldom opened after dark. There is also a gate on each of the other sides; that on the South is seldom opened; the northern one is common to all; and on the East is the Mecca gate, through which, however, Europeans are at times permitted to pass.

There are three mosques whose minarets show to seaward, the most conspicuous being the northern and southern ones; the middle minaret, being lower and half hidden by houses.

On the northern side of the town are six old windmills, and near them is a large tomb, said to be that of Eve, about 92 feet long by 22 feet wide. The streets are very narrow and irregular, and the houses are mostly composed of coralline limestone, some of the newest being large and well built.

The population of Jidda is estimated to be about 20,000, of which 15,000 reside within the walls, and the rest in the suburbs; of these nearly half are Arabs, about the same number Africans (servants), and the remainder natives of Hindustan. From 40,000 to 60,000 pilgrims are said to pass through annually, but the number varies considerably; in 1897 there was a falling off of 12,000 as compared with the previous year, chiefly due to the plague at Bombay. It is to the providing for these travellers and for their conveyance that Jidda owes its prosperity as a port, as it has no wharves or convenience for shipping, and is fronted throughout by extremely shallow water, scarcely available even for boats during the lowest tides in summer. It is reported to be unsafe to go more than a mile outside the town. There are good native divers at Jidda.

Communication and Trade.—Jidda is a port of considerable trade between Arabia, India, Egypt, and Africa; and many of its merchants

* The description of Jidda harbour is mainly from the survey and remarks by Commander W. J. L. Wharton, H.M.S. *Fawn*, 1876.

See plan, No. 2,599.

are enterprising and wealthy. It is a regular place of call, twice monthly, for the British India steam-ship Company's vessels; a French line of steamers, and the vessels of the Austrian Lloyd's touch at irregular intervals.

In 1897, the number of vessels of all nationalities entering the port of Jidda is given at 826, representing an aggregate of 312,989 tons; of this 299,261 tons was carried by 240 steam vessels, nearly half of which were British; the transfer of the Khedivial Steamship Company to British hands will add some 75,000 tons of shipping to the British total. In 1897, the annual value of the exports was returned at £19,250, and they consisted chiefly of hides, skins, gums, mother of pearl shells, senna leaves, and henna. The imports were valued at £644,989, a decrease from the previous year of £48,100, due to the plague at Bombay and famine in India. The trade with Egypt is rapidly increasing. The imports consist chiefly of grain, Manchester goods, woollens, coffee, tea, frankincense, spices, timber, sugar, carpets, crockery and hardware, lead, scents, dates, &c. An ad valorem duty of 8 per cent. is charged on all imports.

Telegraph.—Jidda is in communication by telegraph cable with Sawákin, and from thence by Suez or Aden with all the world. It is connected by telegraph wire with the principal Arabian towns, Yenbo, Medina, Mecca, Ephé, Hodeida, Sana, and Mokha; and is also connected with Perim, by a Turkish cable from Sheikh Syed.

Quarantine.—All arrivals from Indian ports are subject to a quarantine of observation of 10 days, and those from Java to 5 days.

Consul.—Jidda is the residence of a British Consul and Vice-consul.

Coal and supplies.—About 500 tons of coal is usually in stock at Jidda, available for steamers at an average price of 40s. per ton to H. M. ships, and 65s. per ton to merchant vessels; it is put on board by boats, 120 tons being shipped in a day during fine weather, the vessels lying either at the inner or outer anchorage. The operation of coaling is apt to be impeded by strong winds, though but little sea is ever raised by them, and, still more so by low tides, the extreme shallowness of the water then rendering it impossible for the coal boats to pass to and fro. Other supplies are plentiful as there is a good bazaar well supplied with meat, fresh bread, fruit, vegetables, ghee, and oilman's stores generally. There is an abundant supply of fish here, as is the case all along the eastern coast of the Red sea.

Water.—The water supply at Jidda has of late been largely augmented by spring water from a new source, but it is slightly brackish, as is the other water of this town. The average annual rainfall is limited to a few showers which fall chiefly during the months of December and January, when the numerous cisterns and reservoirs owned by private

individuals become filled and form their store for the year.* Mecca is fairly well supplied with water; Medina has an abundance.

The Inner harbour is perhaps the most extraordinary harbour of any so called as to its figure, but is so well protected by lines of reefs that there is comparatively smooth water whatever the direction or force of the wind. It is a narrow strip of deep water, lying north and south, between the reef immediately bordering the shore and the nearest of the outlying reefs; *see* also page 275. The outlying reefs form three nearly parallel lines 10 miles long in a north and south direction, filling up the bay from Ras Gabaz on the north to Ras al Aswad on the south.

There are also many outlying patches, between which are channels navigated by native pilots, but the recognised tracks passing through what are named the gateways, are the only ones described in these directions, as it is these alone which a stranger can take with safety.

Tides and Currents.—There is a regular tidal range, but it is so small as compared with the irregularities in the level of the water caused by the winds, that it is impossible to establish a correct period for the time of high water. In December and January 1833–4, when the harbour was surveyed by Captain Elwon, the greatest rise or fall at springs was about 2 feet; but in the summer months, during northerly winds, when many of the banks are dry, there is less water by about 3 feet than during the southerly winds of the winter season.†

In November and December 1876, when the harbour was re-surveyed by Commander Wharton, a constant northerly set was experienced outside the reefs; but, inside, the currents observed were weak and irregular.

Winds, weather, &c.—*See* Appendix, page 482.

PILOTS.—As a rule, pilots for the harbour will be found outside, but the firing of a gun will bring them off if they are not in waiting. They are generally fishermen, but know the channels well. In proceeding in or out of Jidda harbour, they are mostly guided by the eye, for the channels are so narrow that the marks hereafter given are of but little use, except in approaching the port.

LANDMARKS.—The landmarks by which to identify the position of Jidda before the town can be seen are not easily distinguished by a stranger. The mountains at the back of the great plain extending from the town are so rugged and uneven that it is difficult to identify the peaks; the principal mountains are, however, now described, though it

* The rainfall differs considerably in quantity in different years. The rainfall during November 1895 was the heaviest known to the inhabitants, many of the houses being rendered unsafe by it.

† During a strong northerly gale which blew for five days in the early part of January 1880, the water in Jidda harbour fell about 5 feet—a most unusual occurrence.

See plan, No. 2,599.

may be premised that from a position outside the dangers, when in or near the latitude of Jidda, the town can generally be seen and bearings of it suffice to lead a ship up to the vicinity of the beacons.

Jebel Umm Arar, 580 feet high, is the hill in the range northward of Jidda, showing most to the left on approaching from the southward, and forming the termination of some spurs running westward from the inland mountains; it is the mark to lead inside the Rocky bank, but is frequently obscured by mist.

The Sugarloaf or Jebel Yemeniya is a conical hill, 920 feet in height, in the second range behind the town, from which it bears E. by N. 8 miles. It is a hill much used as a mark, and may be recognised by getting the town on an East or N.E. bearing, when it is the nearest remarkable cone behind the houses.

Saddle hill, or **Jebel Haddah** is the highest and most remarkable of the nearer high hills, and as the loftier range behind Mecca is seldom visible, it is generally the highest land to be seen. It shows as a double peak with a saddle between, is 2,650 feet high, and bears East 18 miles from Jidda.

Jebel Sannam, 960 feet in height, bears S.E. $\frac{3}{4}$ E. 10 miles from the town, and is a small but remarkable pyramidal peak, surmounting a flat hill. It maintains nearly the same appearance from all points of view, and from abreast of Musari reef bears E. $\frac{1}{2}$ N.

Jebel el Moya, $4\frac{1}{2}$ miles W.N.W. of Jebel Sannam, is a low, black, rounded hill forming the southern extreme of the nearest range to the shore. It may be known by its black colour, and by being at the end of the white sand-hills lining the foreshore.

OFF-LYING DANGERS.—Musari reef is a breaking patch bearing W. $\frac{1}{2}$ S. $6\frac{1}{2}$ miles from Ras al Aswad, and S.W. $\frac{2}{3}$ W. $5\frac{1}{2}$ miles from Maruwas reef. Close westward of the Musari reef there is no bottom at 120 fathoms. This reef is generally sighted by ships approaching from the southward, as its breakers show well.

Rocky bank, the westernmost and outer danger of Jidda, is rather more than 2 miles in extent north and south, and nearly the same width; it is separated from the inner group of reefs by a fair open channel 2 miles wide, with from 30 to 40 fathoms, but falls abruptly to very deep water on its northern, western, and southern sides. There are five separate shoal heads on the bank, of which three are dangerous.

Abu Nakla, the southern head, has on it $1\frac{1}{2}$ fathoms, and bears W. by S. $\frac{1}{4}$ S. nearly $2\frac{3}{4}$ miles from the white stone beacon on Gaham, which is the outer beacon in approaching Jidda, and lies N.E. 8 miles from the Musari reef.

See chart, No. 8c.

Al Wastani, with $1\frac{1}{2}$ fathoms, lies 3 cables N. by W. from Abu Nakla, and bears W. $\frac{5}{8}$ S. $2\frac{3}{4}$ miles from the Gaham beacon.

Both these shoals break when there is any swell; and there is a 14-fathoms channel between them. The 100-fathoms contour-line of soundings is less than half a mile westward of them, and between it and them are very irregular soundings with patches of from 9 to 4 fathoms.

The other three heads lie on the northern part of the bank. The westernmost, Al Fokani, is $1\frac{1}{2}$ miles N.W. $\frac{1}{2}$ N. from Abu Nakla, and $3\frac{1}{2}$ miles W. $\frac{3}{4}$ N. from the Gaham beacon. There is nothing less than 8 fathoms water on Al Fokani.

Abu-l-Khodar is 8 cables N.E. by E. $\frac{1}{2}$ E. from Al Fokani, and W. by N. $\frac{5}{8}$ N. 3 miles from the Gaham beacon. There is a small 3-fathoms head on this shoal, with from 7 to 10 fathoms close to.

The shoalest water on Abu-l-Yahud, the north-eastern patch, is 5 fathoms; it bears N.E. by E. $\frac{1}{2}$ E. $8\frac{1}{2}$ cables from Abu-l-Khodar, N. by E. $\frac{3}{8}$ E. 2 miles from Abu Nakla, and N.W. by W. $\frac{1}{8}$ W. $2\frac{1}{2}$ miles from the Gaham beacon. Only $2\frac{1}{2}$ cables northward of this shoal patch there is a depth of 230 fathoms.

Clearing marks.—The Sugarloaf, or Jebel Yemeniya, open the breadth of the town to the south of it, bearing E. by N. $\frac{3}{4}$ N., leads nearly one mile southward of Abu Nakla, the southernmost shoal head of Rocky bank.

The Sugarloaf open the same distance to the north of the town, bearing E. $\frac{5}{8}$ N., leads nearly half a mile northward of Abu-l-Yahud rocky bank, and 8 cables northward of Abu-l-Khodar, its most dangerous head on that side. Jebel Sannam and Jebel el Moya in line E.S.E., leads 6 cables north-eastward of Abu-l-Yahud and up to Middle gateway.

The Sugarloaf on with centre of the town, E. by N. $\frac{1}{8}$ N., leads over the Rocky bank between the patches, in not less than 13 fathoms, but this passage is not recommended.

Anchorage.—In fine weather, a vessel arriving off the harbour too late to enter, will find anchorage on the Rocky bank in the vicinity of Abu-l-Khodar. This anchorage is better than that outside the gateways, though the bottom is but coral and sand.

Leading marks.—Jebel Umm Arar, the western end of the range northward of Jidda, before described, bearing N.N.E. $\frac{3}{4}$ E., leads inside the Rocky bank and outside Maruwas as far as the Gaham beacon.

Jebel Sannan and Jebel el Moya in line E.S.E. lead northward of the Rocky bank and up to the Gaham beacon.

OUTER LINE OF REEFS.—Southward of El Harig, the passage to the gateways, this line of reefs consists of the breaking patches

See plan, No. 2,599, and chart, No. 8c.

of Gaham, Shab Jidda, Umm el Kat, Assamdiya, which are nearly in line about N. by E. and S. by W., and always show; and, the sunken patch Maruwas. Northward of El Harig, all the reefs of the outer line break.

Maruwas, the southernmost of this line of reefs, is a small one-fathom bank N.E. $\frac{7}{8}$ E. $5\frac{1}{4}$ miles from Musari, and S.S.W. 3 miles from the Gaham beacon. As it lies rather outside the line of the four reefs just mentioned, and does not generally break, it is very dangerous for a ship approaching from the southward. The clearing mark has just been given, and as the Gaham beacon can always be seen though Jebel Umm Arar may be hidden, this sunken patch may be cleared by steering for the beacon on a N.E. $\frac{1}{2}$ N. bearing.

Gaham or Outer beacon.—The Gaham reef is the southern boundary of El Harig, the channel generally used in steering for Jidda harbour. A white stone beacon, surmounted with a staff and globe, 20 feet high, and visible 5 or 6 miles, stands $1\frac{1}{4}$ cables from the northern end of the reef, which should not be passed too closely. From this beacon, the south-eastern fort of Jidda bears E. by N. $\frac{5}{8}$ N., $4\frac{3}{4}$ miles, and the Middle gateway beacon N.E. by E., nearly $1\frac{1}{2}$ miles.

There is a channel between Shab Jidda and Umm el Kat, but it can only be used by the eye and requires local knowledge.

Jehan.—Jehan, the southernmost of the northern group, is N.N.E. $\frac{1}{4}$ E. $1\frac{1}{4}$ miles from the Gaham beacon, and is the northern limit of El Harig. It has no beacon, and its southern edge is not clearly defined; care must therefore be taken to give it a good berth. Jebel Sannam and Jebel el Moya in line E.S.E. lead southward of it, and up to the Middle gateway.

Jidda approach.—Conspicuous marks.—Houses forming conspicuous marks have been erected on the following reefs:—A small white house, the quarantine hut, about the middle of Bahri reef; four square white houses on Jezirat Abu Saad, the sand bank above water at the south end of Shab Abu Saad reef; and, similar smaller houses, on the sand bank above water at the south-east end of Shab Wasta.

SECOND LINE OF REEFS.—This line consists of a maze of patches extending north and south about one mile inside the outer line of reefs, with channels between the patches. One of these reefs, of the Fellahiyat, is marked with a beacon, and the passage immediately to the southward of it, named the Middle gateway, is that generally used.

Middle gateway and beacon.—This pass lies between two parts of the Fellahiyat reef, which show well. The beacon, on the northern side of the gateway, and situated nearly half a cable within the edge of the reef, is an iron beacon in shape like a dog kennel, with a vane at each

apex of the roof; it stands on three piles, and is painted red.* A white stone beacon, formerly on the southern side of the gateway, has been washed away, and is (1897) temporarily replaced by a wooden staff. The passage is $1\frac{1}{2}$ cables wide, but is obstructed by the Erg el Fellahiyat or Ulysses shoal, a one-fathom patch which narrows the navigable channel to one cable. This patch is marked at its north-western edge by a small red buoy, about $1\frac{1}{2}$ cables S.E. by E. $\frac{1}{4}$ E. from the red beacon, which, however, cannot be relied on, and in its absence the shoal is not always seen. Neither beacons nor buoys at this anchorage can be depended on as they are frequently washed away.

The right extreme of the town wall in line with Jebel Yemeniya E. by N. $\frac{2}{3}$ N. leads northward of the Gaham reef, and towards a position for passing through the Middle gateway, which must be done by the eye, rather hugging the north-western side marked by the red tripod beacon to avoid Erg el Fellahiyat, which should be left on the starboard hand in entering.

The South gateway is southward of the Fellahiyat reef formerly marked by a white beacon (which will probably be replaced), but it is not recommended to strangers, though much used by native pilots. The dangers on its southern border are all sunken.

The North gateway is the best and clearest pass of all, but is not marked by beacons. It lies on the northern side of the reef marked by the red tripod beacon, is 180 yards wide, and opens in the right direction to lead to the Inner gateway, which the Middle gateway does not. Jebel el Moya on with the South inner beacon on Abu Harit S.E. by E. $\frac{3}{4}$ E. leads through this pass.

Outer anchorage.—Large vessels, and vessels unable to enter the Inner harbour from its overcrowded condition, anchor between the second and third line of reefs north-eastward of Shab Fellahiyat. Here is protection, but the ground is foul and uneven, the bottom being coral and varying in depth from 6 to 20 fathoms in a distance of a few yards. Numerous anchors have been lost here; but there is no better place at a convenient distance from the town.

THIRD LINE OF REEFS.—This line of reefs is more continuous than the others; it has only one opening affording an entrance convenient for the harbour. This entrance is named the Inner gateway.

Inner gateway—Beacons.—This entrance is between Bahri reef on the North and Abu Harit reef on the South, the extremes of both reefs

* H.M.S. *Salamander*, December 1898, reports this beacon destroyed, and wooden structure in its place (probably temporarily). The red buoy on Ergel Fellahiyat had disappeared.

being marked by white stone beacons. The passage is 180 yards wide and quite clear, but neither beacon should be passed too closely as the reefs are not steep-to; nor, as previously remarked, should the existence of the beacons be absolutely relied on.

Leading mark.—The second white house to the right of the town on with the Sugarloaf or Jebel Yemeniya, E. by N. $\frac{3}{8}$ N. leads through the centre of the Inner gateway.

Erg el Allem.—At $1\frac{1}{2}$ cables inside the Inner gateway and E. by N. $\frac{1}{2}$ N. from the South inner beacon, is this coral patch with 9 feet water on its shoalest part, the north-eastern end. The shoal itself is not always visible, and is said to be growing and extending in a northerly direction. There are a number of small shoal heads having depths of from 3 feet to 3 fathoms, lying southward of Erg el Allem and eastward of Abu Harit, which are best understood by reference to the chart.

Shab Burri.—Buoy.*—At $1\frac{1}{2}$ cables northward of Erg el Allem is Ras el Sunni, the southern end of Shab Burri, which shoal, with Shab el Radham, (from which it is only separated by a narrow boat channel), forms a reef more than 2 miles in length from north to south, and is the immediate protection to the harbour or inner anchorage. A floating raft with a red triangular structure surmounted by a staff and ball is moored off the south-eastern point of Shab Burri, E. $\frac{3}{4}$ N. $3\frac{1}{2}$ cables from the Bahri beacon, which should be left on the port hand in entering but should not be passed too closely.

Welled el Ghersh.—Another rocky patch called Welled el Ghersh lies eastward of the southern part of the Burri reef, leaving a harbour channel to the northward between the two, about $1\frac{1}{2}$ cables in width. This shoal is unmarked.

THE INNER HARBOUR.—Inside the Inner gateway, and between shabs Burri and Radham on the western side and the shore reef extending from the town on the eastern side, is the Inner harbour or anchorage, a long narrow space with variable depths and with several patches. With a good light, the shoals and edges can all be seen: but, as much of the anchorage ground is between the depths of 3 and 4 fathoms, the bottom is seen just as clearly at that depth as on dangers, and constant reference to the chart is necessary to discriminate between them. On either side the reefs shoal gradually with numerous tongues of coral. A wreck lies on the western side about 3 cables northward of Ras el Sunni.

Gitah el Mayet Seghir is a patch awash on the eastern side of the harbour 4 cables N. by E. $\frac{1}{2}$ E. of Welled el Ghersh. A wooden

* Not in position December 1898.

See plan, No. 2,599.

framework-buoy surmounted by a cage painted red, is moored on the north-western extremity of the shoal ground extending northward from Gitah el Mayet Seghir.

A tongue of Shab Burri lies N. by E. $\frac{1}{4}$ E. 7 cables from the red buoy near the southern end of Shab Burri.

There are many other small patches and tongues in the harbour which cannot well be detailed, and can only be avoided by the eye and lead.

Anchorage.—The best anchorage in the Inner harbour for a vessel drawing 18 feet, is in the northern part. Here the harbour is wider, clearer, has a uniform depth of from 4 to 6 fathoms, sand, and the vessel is in the nearest position to the town, which is about $1\frac{1}{4}$ miles distant. The holding ground is good. There is, however, a very narrow pass between banks with 19 feet water over them, which it is necessary to pass through, and this part is sometimes crowded with shipping. For a larger vessel, a good berth is in from 10 to 13 fathoms northward of Welled el Gherish and westward of Gitah el Mayet Seghir. For a long vessel, there is excellent anchorage immediately inside the Inner gateway in 14 fathoms, southward of Welled el Gherish; here a single anchor is sufficient. In most other parts of the harbour it is necessary to moor, especially during the pilgrim season when the harbour is crowded, as a vessel at single anchor may entirely bar the passage to the northern part of the harbour.*

Boat passage to town.—The boat channel to the town is over reefs and shallows, and, when the water is low, it is difficult to avoid touching; the passage is marked by small stone beacons about $4\frac{1}{2}$ feet high, and buoys; the red are to be left to starboard when steering towards the town, and the white to port.

DIRECTIONS.—On approaching within 30 miles of Jidda, Jebel Haddah or the Saddle hill will be seen if the weather is clear, and when its northern summit bears E. $\frac{1}{4}$ S. the vessel will be in the latitude of the town. The white minarets will be seen about 11 miles distant. In thick weather, which is frequent during the summer months, the buildings can only be seen at a short distance, and good astronomical observations are then especially necessary before making the land.

Towards noon is the best time for entering, as, owing to the clearness of the water, the sunken rocks then appear as a dark green shadow on the surface, but when the sun is low to the eastward, and there is much glare, or in thick, hazy, or cloudy weather, the rocks cannot be discovered until close upon them. Much care is required in long ships entering or leaving the port, as the turnings are sharp, and a larger per-centage of such vessels ground in entering.

* It is stated that many shoals are being formed in the Inner harbour by the ashes and other refuse thrown overboard from the vessels which anchor there.

See plan, No. 2,599, and chart, No. 8c.

From the southward.—If approaching from the southward, endeavour to sight the Musari reef, if breaking, and when it bears East, one mile distant, steer N.E. $\frac{1}{2}$ E. This leads up to the Gaham beacon, well inside Abu Nakla, and the town will be half a point on the starboard bow when first the course is altered.

If the Musari reef should not be seen, steer for the town between the bearings N.E. by E. and E.N.E.; this leads to a good position for sighting the Gaham beacon, which should be brought to bear half a point on the starboard bow. Then run on until Jebel Yemeniya is on with the right extreme of the town E. by N. $\frac{2}{3}$ N.; this bearing leads a little southward of the Fellahiyat red beacon.

When the Fellahiyat beacon (on the North side of the gateway) bears N. by E. $\frac{1}{2}$ E., alter course quickly to port, steer about N.E. $\frac{1}{2}$ N., and pass through the Middle gateway by the eye. Keep rather on the north-western side of the channel to avoid Erg el Fellahiyat, a shoal which has only one fathom water, and which is marked by a small red buoy on its north-western side.

When the beacon bears West, alter course to starboard and steer E.S.E. for a convenient position for entering the Inner gateway.

When Jebel Yemeniya is in line with the second white house to the right of the town E. by N. $\frac{2}{3}$ N., steer between the beacons of the Inner gateway and close southward of the Burri beacon buoy. When this buoy bears North, alter course quickly to port, and steer up to the anchorage on a N. by E. $\frac{3}{4}$ E. course, leaving Welled el Ghersh shoal on the starboard hand. The anchorage must be selected by the eye.

A sailing vessel should luff closely round the Burri red beacon buoy, if it is intended to gain the upper part of the harbour.

From the northward.—If approaching from the Northward, keep well outside until the Sugarloaf or Jebel Yemeniya is open the width of the town to the north of it; or until the town bears about East, when steer for it, passing to the northward of the Rocky bank, until the beacons are seen, which will guide into a position to enter the Middle gateway.

If Jebel Sannam and Jebel el Moya are seen, these two in line bearing E.S.E. lead clear of all dangers as far as the Fellahiyat beacon.

Other channels.—A sailing vessel may be obliged to take some other passage through the two outer lines of reefs, but the chart and eye must be her guide if she attempt it without a pilot.

North harbour channel.—There is a channel into the Inner harbour round the northern end of Shab el Radham, which channel, owing to the crowded state of the harbour, is from necessity occasionally used; but the entrance between Shab el Radham and Shab Hammama is so narrow and has such a sharp turn, that grounding is generally the result for any but short vessels.

Beacons and Buoys.—Caution.—In the channels just described there are three white beacons, viz., on the northern end of the Gaham reef, and one on either side of the Inner Gateway; also, a red tripod beacon on the Fellahiyat reef at the northern side of the Middle Gateway. There are red beacon buoys on the north-western extreme of Gitah el Mayet Seghir, and on the south-eastern corner of the Burri reef; and a small red buoy on the north-western side of the Erg el Fellahiyat or Ulysses shoal.

Reliance cannot be placed on the beacons or buoys at Jidda, as the former are often destroyed and the latter frequently break adrift, and there is much delay in rebuilding and replacing them.

Directions for sailing vessels between Jidda and Ras Muhammed.—The following remarks by Captain Moresby may be useful to sailing vessels working to windward on this coast. “After a north-wester has been blowing, and light winds prevail, a current generally sets to the northward, more especially on the Arabian coast; on which account the Arabian side, with northerly winds, is the best to work to windward on, and not the Egyptian coast which the old navigators preferred on account of its being more clear of shoals.

“On the Arabian coast, a vessel will be able to take advantage of the winds if she be near the reefs and coast, which winds almost always bear several points more from the land as the night advances, and particularly in the early part of the morning, and are well open to seaward during the day: this is not the case on the Egyptian coast, when northerly, N.N.E., N.E., and easterly winds prevail; at times, from November to March, they cause a strong current to the westward, and as the wind becomes light, it sets back again to the eastward.*

“If the wind continue long in the same quarter, the current sometimes sets against it, which can be seen by the short deep swell, in a N.W. wind, against which the best sailing vessels make nothing for the first and second days, when all at once they unexpectedly get to windward.

“The average time a ship takes to reach Koseir from Jidda depends so much on circumstances that no definite period can be stated; it is seldom performed in less than ten, or longer than twenty days; in the native boats twenty-five and thirty, sometimes more. A ship ought to have good sails bent on quitting Jidda for the northward, and if she be proceeding to Koseir, to work up on the Arabian side so far north as Nomán island, in latitude 27° 6' N., before she attempts to cross the sea to Koseir; for should she make to leeward of the port, it may take her days to work up a small distance.

“From what has been said respecting the currents, it will be essential to ascertain the vessel's situation correctly, taking latitudes by the stars

* See Remarks on cross currents at page 20, and also the *Caution* inserted on every Admiralty chart of the Red sea.

See plan, No. 2,599.

which pass the meridian, as also correcting the longitude at sunset by observations of some of the numerous stars at twilight, which, from the clearness of the atmosphere in this sea, are always to be seen.

"After taking observations at sunset or later, a vessel ought only to stand back to the shore or reefs, half the distance she stands out, and never come nearer than 10 miles off the reefs at night, in case of a current. A vessel cannot do wrong by keeping the Arabian side on board, but should not go too close with a light wind or heavy swell, or if there be much probability of the wind failing. In case it blows hard she can take advantage of the anchorages, having a native pilot on board.

"The native pilots being acquainted with the reefs and anchorages from eyesight, are always able to take a vessel among them with safety; a stranger, not acquainted with the localities, would feel alarmed in navigating among the reefs; they are all safe to approach, taking the precaution to be on the fore-topsail yard with the native pilot, and keeping a good look-out for sunken rocks, the eye and not the lead being the only guide.

"The different shades of green on the coral rocks will show the depth of water and the spot to anchor on; when at anchor, care should be taken of a shift of wind, on the vessel forging a-head, to haul in the slack of the cable, to prevent its taking turns round the rocks, in which case it is with difficulty cleared again."

Native Pilots.—"The hire of a native pilot from Jidda to Suez is about 5*l.*, besides his food. If possible, do not take a very old man; they have little inclination to go aloft, and are generally indolent; it is necessary to keep both old and young on the alert, and never place too great a dependence on them; they know nothing when in the middle of the sea out of sight of land, and nothing of the Egyptian coast, which is essentially necessary should a vessel be in distress, or requiring some refit."

Winds and Weather.—The same authority remarks, "The winds from Suez to Jidda during the whole of the year, are mostly northerly, blowing with great violence at times, but generally moderate with the changes of the moon. During the winter months, from December to April, southerly winds at times prevail for a few days, occasionally blowing fresh; more especially in the gulf of Suez, where they freshen at times to a moderate gale. In these months, in the gulf of Suez westerly gales are not unfrequent; they are called by the natives Egyptian winds, and from their violence are much dreaded. On the Arabian coast, near Jidda, both to the southward and northward of it, northerly, N.E., and easterly winds at times blow with great violence during the winter months bringing off clouds of dust from the land."

At Jidda, during January 1896, H.M.S. *Melita* found the weather usually fine and dry, with very few clouds or a little haze when a northerly wind

prevailed, but always cloudy and damp with southerly and easterly winds; the wind was generally from N.N.E. in the early morning to N.W. at night, force one to 5. The natives say that when the winds remain due North during the night a strong north wind may be expected the next day; and, when the wind inclines to the eastward in the early morning, the winds will be light and the weather fine.

In the previous month, the prevailing wind was northerly, from N.N.E. to N.W., force 0 to 4; with an occasional southerly wind, S.W. to S.E., force up to 5, lasting three days at a time. Winds from East and West were rare and light. Rain fell on two days with south-west wind. See Appendix, page 482.

See plan, No. 2,599.

CHAPTER VII.

EAST COAST OF RED SEA FROM JIDDA TO
KAMARAN BAY.

 VARIATION IN 1900 - - - - 2° 50' W.

 (Lat. 21° 20' N. to lat. 15° 13' N.)

General remarks.—The coast from Jidda to Ras el Bayadh, in lat. 15° 13' N., is bordered by reefs and shoal banks, which, from abreast of Lith, extend far towards the centre of the sea. The extensive Farisan bank which is upwards of 320 miles long and has nearly the same direction as the coast off which it lies, forms the principal boundary of the Inner channel on the Arabian side. Like the Dahalak bank, on the opposite side of the Red sea, the Farisan bank is too shoal and dangerous, and also too little known to be crossed throughout the greater part of its length.

THE INNER CHANNEL, from Jidda to Lith, passes inshore of numerous sunken rocks, breaking patches, and reefs, the south-western-most of which is Kad Homeis; the shore throughout is fringed by coral reefs. It is generally narrow until past Kishran, 20 miles W.N.W. of Lith, from whence there is a passage to the open sea, bounded on the North by Kad Homeis, and on the South by the northern part of the outlying reefs of the Farisan bank, extending from thence to the southward. The channel is generally only 2 or 3 miles wide, has very deep water with some shoal patches and very indifferent anchorages, mostly mere stopping places for boats formed by breaks in the coast reef or rocky patches off it, affording little protection from the sea even for the native boats, called bagalas. There are no towns on this part of the coast nor any supplies obtainable.

From Lith to Kamaran, the shore is generally bordered by coral reefs, and the inner edge of the outer reef between Lith and Surrein islands consists of extensive sunken rocks, dangerous outlying patches, and small islands with deep water close to them, and the Inner channel at this part for a distance of about 40 miles is very intricate; but, after passing Surrein, it is clearer and there are many good anchorages but also many sunken patches in the channel. A little northward of El Birk, the channel is

See charts, Nos. 8c and 8d.

contracted to a width of one and 2 miles by the bank Umm Kerkan, the northern part of which, in lat. $18^{\circ} 24\frac{1}{2}'$ N., is very shoal, but there are 2 and 3 fathoms on other parts. After passing this extensive bank, the Inner channel becomes comparatively open.

The Coast from Ras al Aswad, the southern horn of the bay of Jidda to Lith, has a general south-easterly direction for upwards of 100 miles; it is low, and, as before stated, fringed throughout the whole distance by a reef, which extends from the shore in some places more than a mile. Within this length of coast, there are numerous detached outlying reefs extending from 8 to 17 miles from the shore.

Landmarks.—Between Jidda and Lith there is some high land in the interior which is remarkable.

Jebel Abu Shaub, in lat. $20^{\circ} 55'$ N., and 10 miles inland is a small two-knobbed hill.

Jebel Sadiyah is a remarkable peak on the highest part of the land in the distant range north-eastward of Mahram; a little eastward of it is a peak still more remarkable by which it may be known.

Sugarloaf is a peaked mountain, its top forming three small peaks N.N.E. 18 miles from Mersa Kishran; it is in line with Jebel Sadiyah and Tower hill on a N.N.E. $\frac{1}{4}$ E. bearing.

Tower hill.—The range of hills from the northward converges towards the coast between Mahram and Kishran, and Tower hill is a little inside the extreme of the range as seen from Mahram; it is a remarkable piece of broken land, not unlike a tower; but off Kishran and south-eastward of it, it shows as a double rugged top and appears much larger in this latter direction; the piece of land outside it shows as two round hills.

First and Second Peaks are south-eastward of Tower hill; at Mahram, these appear as the two highest peaks on two sloping mountains, like wedges; both peaks are double.

West Peak.—At Kishran, a peak on the second range, called West peak, appears between First peak and Tower hill; and Second peak, from this direction, shows as a round mound on the high land to the right of First peak, with a peaked elevation on each side of it.

Ras al Aswad, the southern extreme of the bay of Jidda, is a low sharp point, bordered by a shore reef. S.W. $1\frac{1}{2}$ miles from it, and on the shore reef, is the little island Ghorab.

Someima is $7\frac{1}{2}$ miles southward of Ras al Aswad. This anchorage, in 9 fathoms, mud, is in a sort of bight in the coast reef and is open to the north-west, but affords tolerable shelter from southerly winds. When at anchor, Jebel Sannam peak is a little open northward of Jebel Haddah saddle.

IRK-EL-GHORAB is a breaking reef having no soundings at 120 fathoms close westward of it. It bears S.W. by W. $8\frac{1}{4}$ miles from Ras al Aswad, and S. $\frac{3}{4}$ W. $4\frac{1}{4}$ miles from the Musari reef.

Kobbein, Alkasr Shamiya, and Alkasr al Yemaniya, are breaking reefs from 5 to 9 miles off-shore, and are all on the same bank, which is about 11 miles long in a N. by W. direction and about 9 miles wide. There is a deep water channel between the bank and the shore reef; and, generally, from 10 to 25 fathoms on the bank between the clusters of reefs. Kobbein, in lat. $21^{\circ} 12' N.$, long. $39^{\circ} 1' E.$, is the northernmost of the group.

Katat Teffa and **Katah Kidan** are two reefs, separated from each other by a deep water channel 2 miles wide. Katat Teffa is $3\frac{1}{2}$ miles from the coast reef, and 2 miles S.E. $\frac{1}{2}$ S. from it is a rocky patch. Between these reefs and the shore, there is a passage $1\frac{1}{4}$ miles wide at its narrowest part in lat. $20^{\circ} 58' N.$

Kidan is S. by E. $\frac{1}{2}$ E. 22 miles from Someima. There is anchorage off it in 4 fathoms, with tolerable shelter from westerly winds in a bight of the coast reef, but it is open to the southward.

Abu Shauk is 25 miles from Someima in a S.S.E. direction. This place has excellent anchorage in 6 fathoms, but the entrance is very narrow between the reefs off it. Jebel Abu Shauk bears from this place E. $\frac{1}{4}$ N., and is about 10 miles inland.

Abu Shauk reefs lie S.S.W. $\frac{1}{2}$ W. 5 miles from Abu Shauk. These are the most northerly of a group that extends 13 miles in a S.S.E. direction, of which Towil Raghwan reef is the most southerly. Between the reefs in this space there are channels, but very difficult ones, and the shoals are so numerous that they may be considered as forming a connected line which ships ought not to attempt to pass through. There is deep water close to their western side.

Kuff is a small bight in the coast reef about 5 miles S.E. by S. from Abu Shauk; there is anchorage in 11 fathoms on rocky bottom, but no shelter is afforded.

Katah Abu Duda is a patch of rocks W. by N. 3 miles from the inlet Abu Duda. There is deep water between it and the shore reef. Of the capabilities of the inlet we have no account.

Mahram, in lat. $20^{\circ} 25' N.$, is the next available anchorage near the shore southward of Kuff, but it is not good, there being straggling rocks in it. A vessel wishing to stop here had better anchor outside the rocks off it.

Mirkat is nearly 8 miles south-eastward of Mahram; the anchorage is just southward of the shoals off it, which afford some little shelter from westerly winds.

SHEJAH REEF lies S.W. by W. from Mahram 5 miles distant; the Inner channel is between them. The Shejah reef consists of two parallel branches, each about $1\frac{3}{4}$ miles long in a north-east and south-west direction and separated from each other by an 8-fathoms channel half-a-mile wide. A second reef lies N.W. $2\frac{1}{4}$ miles from Shejah, and between the two there is a channel with about 14 fathoms water. A third reef, about 2 miles long, lies E.S.E. $2\frac{1}{2}$ miles from Shejah, with a deep water channel between the reefs.

KAD HOMEIS, its north-western part in lat. $20^{\circ} 15' N.$, long. $39^{\circ} 25' E.$, is a breaking reef upwards of 2 miles in extent in a north-west and south-east direction, and 16 miles from the nearest point on the mainland. On its south-eastern part is a sand island about 5 feet high; there is deep water all round this reef.

Current.—In April 1862, H.M.S. *Hornet* experienced a westerly set of $1\frac{1}{2}$ miles an hour in the vicinity of Kad Homeis.

Reefs.—E. $\frac{3}{4}$ S. 17 miles from Kad Homeis and 6 miles from the nearest land, is a patch of rocks; and, E. by S. $\frac{1}{4}$ S. 22 miles from Kad Homeis, are two reefs which break; the southern reef is surmounted by sand, and is nearly 8 miles from the nearest land.

Caution.—Between Kad Homeis and Mahram there are numerous shoals, and many others extending in an E.S.E. direction towards the coast at Mirkat, so that much care is required in approaching that locality. An extensive reef was observed from H.M.S. *Philomel* in 1881, bearing N.N.E. about 7 miles from Kad Homeis.

JEZIRAT KISHRAN is an island about 14 miles long, in an E.S.E. and W.N.W. direction, the western end being in lat. $20^{\circ} 15' N.$, long. $39^{\circ} 56' E.$ It lies right across the entrance of a large bight, almost filling it.

Mersa Kishran.—This anchorage, at the western entrance to the bight behind Jezirat Kishran, has a rocky bar at its entrance with $2\frac{3}{4}$ fathoms water on it; the bar appears to connect the coast reef off Kishran with a shoal eastward of it, by which the anchorage is protected; the depths are 5 or 6 fathoms, muddy bottom. In a south-westerly wind, a heavy swell rolls into this place and the surf breaks on the bar. Tower hill bears N. by E. $\frac{1}{2}$ E. from the entrance.

Sumar island, at the western end of Shab el Jeffin and about a mile from the shore of Jezirat Kishran, is eastward of the shoal which shelters the Kishran anchorage, and the bight between that shoal and the island, called the Sumar anchorage, is preferable to Kishran anchorage; the depth in Sumar anchorage is about 6 fathoms, mud.

Shab el Jeffin.—From the island of Sumar, this shoal extends beyond the centre of Jezirat Kishran, running nearly parallel with that island for about 9 miles in an E.S.E. direction, leaving a narrow 2-fathoms channel between it and the island reef. At the western end of Shab el Jeffin, its outer edge is only a mile distant from the shore; at its eastern end it is rather more than 2 miles. Under shelter of its eastern end, and about a mile from the shore of Jezirat Kishran, just at the entrance of the narrow channel between it and the reef, a vessel may anchor in muddy bottom just southward of the discoloured water.

Katat el Gursh, or Mid-channel reef, in the fairway of the northern channel to Lith, is about $3\frac{1}{2}$ miles long north-west and south-east; the north-western part is nearly 2 miles S. by E. from the eastern end of Jeffin reef, and, for a distance of 4 cables, is awash; the remainder has 12 feet water over it.

Two remarkable peaks in line N. by E. $\frac{3}{4}$ E. lead north-westward of the reef. Abulat cone, close to the western side of Abulat island and very conspicuous, bearing S. by E. $\frac{1}{2}$ E. leads westward.

LITH.—The town of Lith, in lat. $20^{\circ} 7\frac{1}{2}'$ N., is small and consists of a number of mud houses about $1\frac{1}{2}$ miles inland. It is governed by an Arab Sheriffe subject to the Pacha of Jidda. From the latter place to Lith, the journey occupies three days by land. The coast in this vicinity is low, sandy, fronted by coral, and covered in some parts by bush, but inland and to the northward the ranges of mountains, of which Tower hill and Jebel Sadiyah form part, present a remarkable appearance.

Water may be obtained at Lith as well as a few sheep and fowls, but the inhabitants are poor and the country generally in a disturbed state. An Austrian Lloyd's steamer calls here at about tri-monthly intervals on her passage from Loheiya and Kunfida.

Northern channel to Lith.—This channel is difficult of approach unless one of the islands has been sighted, or unless the high land is visible. In 1862, Commander Dayman, H.M.S. *Hornet*, bound from Massawa to Lith, remarked "The weather was fine when we steered for the channel, but the higher lands were hidden by haze, and although we had sights both for latitude and longitude, and had an Arab pilot on board, we could not discover that we had passed through some of the detached reefs to the northward, until we were close to the land and had clearly made out the north-western end of Shab el Jeffin."

Caution.—Commander Wharton, H.M.S. *Fawn*, remarked in 1877, that the positions of the reefs westward of Abulat island are doubtful: the currents also are strong and uncertain in direction, and the water too deep for anchorage; much caution is, therefore, necessary when navigating in this locality.

See chart, No. 8c, and plan of Lith.

Lith Inner anchorage is small, but well protected by the two reefs off it, between which is the best entrance; the depths are from 4 to 6 fathoms, mud. In leaving this place, if going to the southward of the eastern patch, it will be necessary to luff close round its point to the south-westward, to avoid many dangerous patches off the shore reef.

Lith Outer anchorage.—The best anchorage in the outer road is from 5 cables to one mile S.S.W. of Agha island, in 10, 12, or 14 fathoms, mud, but there is no shelter here from northerly or north-westerly winds. About $1\frac{1}{2}$ miles S.W. of Lith is an extensive reef of innumerable patches, with a channel on either side of it.

Agha island, westward of Lith anchorage, is small, low, and sandy, and has on it several houses.

The local pilots state that S.W. by S. 4 miles from Lith is the tail of an extensive shoal which is connected by foul ground with the shoal marked as lying S.S.W. of Lith. The latter shoal is said to extend some 2 miles farther westward than was formerly supposed; to clear it, a vessel leaving Lith anchorage should steer W. by S. until Tower hill bears N.N.W. $\frac{1}{4}$ W.

Inner channel from Lith to Kamaran.—General Remarks and Directions.—The following remarks are largely taken from directions given by Captain Elwon, chiefly with a view to the navigation of these channels by sailing vessels; the mariner will, however, readily adapt them to the altered circumstances of steam navigation. See also remarks on the Inner channels at page 29.

From Lith to Kamaran the Inner channel is bounded on the western side by the numerous islands, rocks, and rocky patches profusely scattered on and about the inner edge of the Farisan bank, and on the eastern side by the shore, which is bordered by a reef nearly throughout the whole extent, in which, however, are several breaks, some of them affording secure anchorages.

Should it become necessary to pass from the central track to the Inner channel, it is requisite to make certain of the vessel's position, so as to be at a moderate distance from the reefs at dawn, in order to have as much daylight as possible to run across with; and a sharp look-out must be kept for sunken patches, some of which can only be seen in clear weather and when the sun is in the opposite direction to the ship's course.

The best entrance from seaward is westward of Lith. There is one near the southern end between Loban and Entufash islands, over the tails of the banks, and another between Okban and Kamaran islands. The southern entrance, however, is between Kamaran island and Ras el Bayadh, and is only 2 cables wide between the 5-fathoms contour-line off the latter, and

See chart, No. 8c and plan of Lith.

that which extends towards it from the island. Native boats sail night and day through both channels.

From Lith to Jelájl, the shore is entirely bordered by reef, and there are several patches scattered about in mid-channel, leaving occasionally only narrow spaces between them and the inshore side of the Farisan bank. Raka has a good anchorage, which may be taken if necessary. Off Jelájl the channel is 2 miles wide, and at this place there is also good anchorage.

The northern edge of a shoal on which H.M.S. *Osprey* grounded in March 1883, lies about 3 miles from the shore in the neighbourhood of Raka, with Chimney peak bearing N.E. $\frac{1}{4}$ N. Other shoal patches are reported to exist eastward and south-eastward of it. Much caution is requisite when navigating in this neighbourhood.

About a mile southward of Jelájl is the commencement of an extensive reef, about 5 miles long, in the middle of the channel. On either side of this reef there is a passage; the best is next the shore and is about 2 cables wide, with a depth of 5 fathoms; the western one is wider, but is not so good a channel. Either may be used, as most convenient, according to the direction of the wind; but a strict look-out for shoal patches is absolutely necessary, particularly in the western channel.

Jinnabiyat, a low bushy island, lies near the southern extreme of the large central reef, and the channel lies eastward of the small island $1\frac{1}{2}$ miles eastward of Jinnabiyat; and, from thence, near the edge of the outer reef, about S.S.E. between the two patches lying off the eastern end of Surrein.

From Surrein to the Kefil islands, reefs and rocky patches continue to mark the eastern edge of the Farisan bank. The Kefil and Fara islands also mark the western edge of the channel and may be passed at a moderate distance. Good anchorage may be found at Dauka on the mainland. From the southern end of the Fara islands, a course may be steered to a position off Kunfida, observing that the inner edge of the Farisan bank southward of those islands is marked by rocks and rocky patches, having deep water close-to. By passing near this edge, the patches about 3 miles south-eastward of the islands will be avoided. At Kunfida, the channel is 8 miles wide, and has from 18 to 20 fathoms water; shoal patches extend 4 miles W. by S. of Kunfida.

From Kunfida anchorage, the best track is eastward of Umm-s-saifa and Umm-ul-Komari islands, care being taken to avoid the rocky shoals in their vicinity, which are easily seen. Off Ras Abu Kalb, there are some reefs nearly in mid-channel which may be passed on either side, as most convenient, always maintaining a good look-out. If deemed advisable to pass eastward of these reefs, it is best to sail through Andah roads, as

good anchorage may be found there, and, having cleared the reefs, a course may be steered to pass about $1\frac{1}{2}$ or 2 miles off Hali point.

Between the bank Umm Kerkan and the coast reef extending between Umek and Nohud, the channel is about a mile wide; the 2-fathoms patch off the northern end of that bank may be passed on either side. Between the northern end of the bank extending off Jezirat Marka and the reef off Nohud, the channel is only $1\frac{1}{2}$ miles wide. Abreast of Abu-l Mahlef island, in lat. $18^{\circ} 7' N.$, the passage is 4 miles wide, and from thence as far as the island of Firán, it is 10 or 12 miles wide; it then narrows to 2 miles between Shura island and the mainland of Ras Turfa.

From Shura island, in lat. $17^{\circ} 1' N.$ the channel lies eastward of Jezirat Hibar and of Umm el Karib and Dahret Jaferi, the breadth being about 3 to 5 miles, afterwards increasing to 10 miles until the northern end of the reef extending from Ashik island is reached. The width of the channel then diminishes gradually until abreast of Ras Musaghib where it is rather less than 2 miles wide. From Ras Musaghib, the track lies along the shore eastward of the islands, and on to Loheiya where the channel is 2 miles wide.

From Loheiya, the Inner channel lies eastward of Urmek island, but in this part is so narrow and intricate that it appears advisable to pass outside of that island, where there is a broad, clear, deep passage; from thence, it passes eastward of Kamaran island and between it and Ras el Bayadh where, as before stated, the passage is probably less than $3\frac{1}{2}$ cables wide.

The Track.—The mariner using the Inner channel just described is advised to trace on the chart the track recommended, and then refer to the particular descriptions, given on the following pages, of the places he will have to pass on the passage.

Soundings.—The soundings throughout are of moderate depth and will be best understood by reference to the chart.

Remarkable Mountains.—Between Lith and Kunfida there are some noticeable mountains, viz.:—

Jebel Shakah, in lat. $19^{\circ} 59' N.$, long. $40^{\circ} 58' E.$, is a remarkable piece of land on the second range north-westward of Jebel Dauka.

Jebel Dauka is also most remarkable, it is on the highest range of mountains northward of Kunfida. In that direction, it runs off to a peak, but its northern extreme more resembles a wedge, the thickest part of which is to the North.

Kauz Abu-l-Ayir is the highest range of mountains eastward of Kunfida; its northern brow appears as a high mound until well to the southward, when it becomes rugged; its southern brow has a small but conspicuous peak. This mountain may be seen from northward of Ras el Askar; it is not shown on the charts.

DESCRIPTION of the INNER CHANNEL from LITH to KAMARAN.—**Raka** lies S.E. by E. 13 miles from Lith roads. For more than the latter half of this distance the coast reef extends upwards of 2 miles off shore, at the other portion its breadth is about half a mile, with some patches off it and from 6 to 10 fathoms at a short distance outside it. The anchorages of Lith, as already described at page 286, are formed and sheltered by patches, of which the largest is fully 3 miles to the south-westward. A vessel going to Raka, and being just outside this patch, should first steer about S.E. by E. for 7 miles, taking care not to get into less than 14 fathoms, to avoid the extensive patches off the shore reef; and, when southward of these, an E. by S. $\frac{1}{4}$ S. course for 5 or 6 miles will carry her to the entrance of Raka, but the soundings are very irregular, there being from 12 to 5 fathoms, rocky bottom.

Anchorage.—Raka may be known by the high sand-hills close to the beach eastward of it; it has good and well protected anchorage in a bight of the coast reef, in 4 fathoms, mud. The reef here extends nearly 2 miles from the shore, and there are some rocky patches off the entrance; also the extensive shoal, Shab el Mudharr, in patches, bearing from S. by E. to S.W. from the anchorage, and nearly a mile from the coast reef; there are other patches southward and south-eastward of it.

ABULAT ISLAND is the northernmost island on the Farisan bank, and is about 3 miles within the edge of that part of the bank abreast of it. Abulat is on the western side of the Inner channel and is $2\frac{1}{2}$ miles long, north-west and south-east, three quarters of a mile wide, from 250 to 300 feet high, and surrounded by a sandy plain. It is quite barren and destitute of water; branches of coral are observable sticking out of its highest parts. Abulat cone, a high and very conspicuous rock, lies close to the western side of the island. Here there is also a small port fit for fishing-boats; and, beyond it to the westward, breaking reefs as far as can be seen from the top of the island. There are also several rocky patches near the edge of the bank northward of the island.

Reefs.—About 5 miles N.W. by N. from the north-western end of Abulat is Katat el Jebel, a breaking reef, and the northernmost on the Farisan bank; there are 22 fathoms water close to its northern side, and the channel between it and Katat el Gursh is 3 miles wide. The positions of the reefs westward of Abulat island are doubtful, *see* Caution, page 285.

From Katat el Jebel, the edge of the bank forming the western side of the Inner channel has a general E.S.E. direction for about 15 miles, and from thence S.E. $\frac{1}{2}$ E. for 13 miles, at which spot is a large round reef with two patches on it, bearing W.N.W. 4 miles from Ras el Askar.

The edge of the bank then continues in a S.S.E. $\frac{1}{2}$ E. direction to Jinnabiyat island. All along this space there are many rocky patches,

and deep water close to the edge, but no navigable passage through to seaward.

The Coast between Raka and Jelájl is low and sandy, and forms a bight bordered with coral reef in which are several patches of 3 and 4 fathoms depth, with 20 and 24 fathoms between them.

Jelájl has good anchorage in 8 or 9 fathoms, mud. Entering from the N.W., after passing Shab el Mudharr, before mentioned, steer for the point of the reef off the entrance, and leave all the sunken patches visible on the port hand in passing them. At this place there is neither house nor hut.

RAS EL ASKAR lies S.E. $\frac{1}{2}$ S. 5 miles from Jelájl; it may be known by having trees on it, there being no others on the shore near it.

Rocky bank.—At $1\frac{1}{2}$ miles S.S.E. from Jelájl is the northern extreme of a cluster of rocks on a bank about 5 miles long and 2 miles wide. The patches are very numerous, have deep water between them, and, on some of them, there are 2, 3, and 4 fathoms. There is a channel for ships on either side of this bank.

Channel.—The passage eastward of the rocky bank is considered the safest, as the shoals can be much better seen than in the western channel, though the latter is almost always used by sailing vessels when the wind is from the westward, as by going through the eastern one, they would, in all probability, have to tack to clear the coast and regain the centre of the channel. The eastern passage is less than a mile wide eastward of the small island Jinnabiyat, 2 cables wide abreast of Ras el Askar, and has a depth of 5 fathoms.

In going through either of these channels a good look-out is required, and, in coming from the southward, the extensive reef in patches that separates the channels will be seen, as well as the sandbank on the southern part of it; these will be a good guide to judge the distance of the vessel from the patches forming the western side of the western passage, on which the least water found was 2 fathoms.

If going through the eastern channel, pass in between the sand-bank just mentioned and an island S.E. of it, taking care to avoid a 2-fathoms shoal in this channel about half a mile off the island, with 12 fathoms close to it; or pass eastward of the island, keeping a good look-out for the patches off them, where the least water found was 3 fathoms.

JINNABIYAT ISLAND is on the eastern edge of the Farisan bank, which forms the western side of the Inner channel for nearly 300 miles; it is nearly 4 miles distant from Ras el Askar in a S.S.W. direction. The island is over 2 miles long N.W. by W. and S.E. by E., narrow, and surrounded by a reef. A similar island, about a mile long and also

surrounded by a reef, lies eastward of Jinnabiyat; both are low and bushy. The channel between the two islands is only used by small native vessels. Off the north-eastern side of the latter island are two small islands with reefs round them.

Islets.—In a S.E. by E. direction and $2\frac{1}{2}$ miles distant from the eastern end of Jinnabiyat is a small island surrounded by a shoal, having 15 fathoms on its south-western side; there is a shoal patch about a mile westward of this islet. This small island is the southern islet of a group of four, very similar in appearance, which extend in a south-easterly direction from the eastern end of Jinnabiyat; they are surrounded by reefs, and between some of them there are deep channels.

From Jinnabiyat to Surrein island, the eastern edge of the Farisan bank is studded with rocks and shoal patches.

Ras el Humar and Ras Mahasin.—Ras el Humar, S.S.E. $\frac{3}{4}$ E. 8 miles from Ras el Askar, the coast between the two being bordered by a reef, is a tongue of land extending in a southerly direction from the mainland; and Ras Mahasin, bearing from it S.E. $\frac{1}{2}$ S. $7\frac{3}{4}$ miles, projects towards it in a north-westerly direction, the two points enclosing between them a bay of considerable size, bordered throughout by reef. In the mouth of this bay, and in line between the points, is an island nearly 3 miles long north and south; it has reefs and patches, with channels between them, extending from its northern end to Ras el Humar, the northern point of the bay. There are also reefs and patches on the eastern side of the island in the bay; off its western side, there are numerous reefs and rocky patches, with deep water between, extending completely across the channel to Surrein island, which is 5 miles distant. Off its southern end, and a mile westward of Ras Mahasin, there is also a rocky shoal.

SURREIN ISLAND, its eastern end in lat. $19^{\circ} 37' N.$, long. $40^{\circ} 38' E.$, and bearing West 7 miles from Ras Mahasin, is high with an irregular top, about 7 miles long, and one mile wide; it is surrounded by a broad reef of madrepor or branching coral, and there are some patches on the south-eastern part, which forms the inner boundary of the outer reefs. The island consists of coral and sand, and there being neither water nor wood, is not inhabited. There are some patches south-eastward of it on the edge of the Farisan bank, which here bends to the southward, the reefs at its edge joining the Kefil islands.

Channel.—There are 19 fathoms close N.E. of the eastern extreme of Surrein, and, E. by N. from the same point, there is a patch close to the reef on which Surrein stands; the best channel is between this patch and another a mile distant to the N.E.

Kefil islands.—These islands, whose northern extreme is in lat. $19^{\circ} 34' N.$, are nearly joined to the eastern end of Surrein island by shoal patches, which, like the Kefil islands, are on the edge of the bank. The islands are low and sandy with a few bushes and extend in a serpentine form on the western side of the channel.

Fara islands, on the same side, adjoin the Kefil islands. They are on the edge of the bank and are of a very similar description; their southern extreme is in lat. $19^{\circ} 17' N.$, and immediately southward of them is the entrance to a channel across the Farisan bank used by native *bágalas*.

On the eastern side of the channel, S.S.E. $2\frac{1}{2}$ miles from Ras Mahasin, is a small island with reefs extending a mile westward of it. At 5 miles from the Ras, on the same bearing, are two small islands having a reef half a mile to the northward, and 12 fathoms water south-westward of them; the two islets are 2 miles S.W. from Ras Zugheib, the nearest point on the mainland. The channel lies westward of these islets.

Dauka anchorage.—Dauka is 8 miles south-eastward of Ras Mahasin, and has good anchorage in 5 fathoms eastward of a small patch which shelters the roadstead. There are a few huts, and the inhabitants are civil; no fresh water can be obtained.

Reefs.—Two reefs with some small islands on them lie westward and southward of Dauka, extending in a S.S.E. direction about 5 miles; they are from one to 2 miles off shore, and there are 6 and 7 fathoms water between them and the coast reef. Some patches lie N.N.W. of them, and, from these, others with from 6 to 8 fathoms between them extend westward to near mid-channel, where there are the two small islands already mentioned as bearing S.S.E. 5 miles from Ras Mahasin.

The navigable channel lies westward of all these reefs, and is about 2 miles wide at this part, having from 9 to 12 fathoms water in it.

Ras Matwiya is S.S.E. $\frac{3}{4}$ E. 21 miles from Ras Mahasin, and 14 miles N. by W. $\frac{1}{2}$ W. from the northern entrance point of Kunfida. About $1\frac{1}{2}$ miles W.S.W. from Ras Matwiya is the northern end of a reef with two small islands on it, which extends from thence S.S.E. $2\frac{1}{4}$ miles. Northward of the Ras, the coast reef extends 2 miles off-shore to a point with 6 fathoms at its extreme; from thence it turns to the northward and rejoins the coast. Between this and the reef last-mentioned, there is a channel a mile wide, with 5 and 6 fathoms water; the channel westward of the reef, between it and the Fara islands, is the main channel and is 4 miles wide, with 12 fathoms water.

There are two small islets surrounded by reefs, lying S. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from Ras Matwiya. The north-eastern islet has a small patch off its south-eastern side, half a mile distant. The best channel lies westward

of these islands, which are $3\frac{1}{2}$ miles distant from the southernmost of the Fara group.

Between Ras Matwiya and Kunfida, there are several rocky patches and low islands from one to 2 miles distant from the shore.

KUNFIDA, in lat. $19^{\circ} 8' N.$, is a small walled town with a Turkish garrison, and has two forts facing the sea; on its southern side, without the walls, is a mosque with a minaret.

Supplies.—Kunfida has a small bazaar with supplies sufficient for the consumption of the place; but, by waiting a few days, cattle and sheep, as well as vegetables, may be obtained from the interior. The best water on the coast is to be had here, and as quickly as the ships' boats can carry it off; it is brought down in mussucks, on camels, alongside the boats, and the casks filled. In July and August, good grapes may be obtained.

The only steam-vessels which visit Kunfida are those of the Austrian Lloyd's Company, which call at intervals of three months on their voyage from Loheiya to Lith.

Anchorage.—The southern side of the anchorage is protected by a low bushy island surrounded by a reef, easy to be seen, and which may be approached closely in luffing up to fetch the anchorage; the island is about 8 cables south-westward of the minaret. There is a small shoal between the island reef and the northern point of Kunfida bay, and the best channel to the anchorage is between it and the island reef, where there is a width of $4\frac{1}{2}$ cables and a depth of from 5 to 8 fathoms. Eastward of the island, there is a narrow channel of 4 and 5 fathoms, which should be used only by boats or by those having local knowledge; it is between the island reef and a rocky spit projecting from the shore reef southward of the town. There is also a shallow 2-fathoms channel northward of the small shoal in the entrance, but it is rocky and not to be recommended. The anchorage is westward of the town from 5 to 8 cables from the shore in from 6 to 4 fathoms water, taking care to avoid the spit from the shore reef before mentioned.

Shoals.—From one to 3 miles West and W. by S. from Kunfida there are rocky patches.

From Kunfida to Makasir, the shore is bordered by reef, and there are several outlying patches and low islands as much as $1\frac{1}{2}$ miles from the shore, with from 6 to 12 fathoms between them and the coast reef.

Jebel Hali is a mountain in the nearest range of hills, south-eastward of Kunfida; it is a very remarkable pyramidal piece of land when seen from that place or northward of it, but, in proceeding southward, it quickly alters, and, at Andah, appears as an oblong hill, with its northern part rounded off abruptly.

See chart, No. 8c, and plan of Kunfida.

Umm-s-Saifa is a small, low, sandy island covered with bushes, S.S.W. 5 miles from the town of Kunfida. There is a rocky patch 2 miles north-eastward of this island.

UMM-UL-KOMARI islands are also small, low, sandy, and covered with bushes; the western one lies N.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles from Makasir point. Nearly in the same direction, from $5\frac{1}{2}$ to 7 miles from the same point, there are two shoal patches, the westernmost being only a mile from the edge of the bank on the western side of the channel. Nearly 2 miles S.E. $\frac{3}{4}$ S. from the western island is the outer of two shoal patches lying in the same line. All these patches are easily seen.

Channel.—The best channel is between the islands and the mainland; or you may pass between the islands, avoiding the rocky shoals southward of them and a rocky patch off the northernmost one.

Anchorage.—There is anchorage all round the Umm-ul-Komari islands.

Makasir anchorage.—Makasir is 11 miles S. by E. from Kunfida roads, and has good protection from southerly winds in a small bay northward of the point, but there are some small patches in the entrance to the anchorage.

Andah anchorage is between the coast reef and Andah shoal, which is 3 miles long north and south. On the southern part of the shoal are some dangerous patches; its northern extreme is $1\frac{1}{2}$ miles southward of Ras Abu Matna. The depth in the anchorage is about 5 to 7 fathoms. The safest channel, in or out, is northward of the reef, and if going out through the southern entrance, run 3 or 4 miles to the southward of the anchorage before hauling to the westward, in order to clear the dry reefs, south-westward of Andah shoal.

Dry reefs.—At 3 or 4 miles south-westward of Andah shoal are three dry reefs; there are passages between each, and also between them and Andah shoal.

Serom, 4 miles southward of Andah, is a small place where there is an anchorage for boats.

RAS ABU KALB, in lat. $18^{\circ} 41\frac{1}{2}'$ N., long. $41^{\circ} 12'$ E., is 9 miles southward of Andah. The coast reef, which continues between the two places, at this point stretches off about a mile to seaward.

Reefs.—Abreast of Ras Abu Kalb and nearly in mid-channel are two reefs in broken ridges partly above water; the northern reef is 2 miles long N.N.E. and S.S.W., the southern is $1\frac{1}{2}$ miles in length North and South. These reefs may be passed on either side, but, if passing westward of them, a good look-out must be kept for a patch which lies W. by N.

See chart, No. 8c.

6½ miles from Ras Abu Kalb. The North extreme of the reefs is 4 miles N.W. ½ N. from Ras Abu Kalb.

Dubareh is a small low sandy island on the Farisan bank in lat. 18° 46' N. and 4 miles within the line of reefs marking the western side of the Inner channel on the edge of that bank.

Firandiya islands, also on the western side of the channel, but near the edge of the bank, in lat. 18° 41' N., are two small oblong table-topped black rocks, about 40 feet high.

From these islands southward, the inner edge of the Farisan bank is not so clearly and sharply defined as it is the whole distance northward of them.

Jebel Sabaya island is 4 miles S. by E. from the Firandiya islands, and is about 2 miles square and 60 feet high, sloping a little at the top towards its rugged sides. On the western side of the island, there is a village consisting of fishermen's huts.

Jezirat Kutna.—The northern point of this island is 2 miles southward of the nearest extreme of Jebel Sabaya, and the island is about 5 miles long by 2 miles wide. It is a low coral island, having bushes on it, and is surrounded by a reef which extends off nearly 3 miles to the south-east with some large rocks above water, like small islands. The soundings eastward of it are 30 and 35 fathoms, mud, decreasing gradually to the coast. The other sides have deep water close-to.

CHANNELS to SEAWARD.—Between the Firandiya islands and Jebel Sabaya, also between Jebel Sabaya and Jezirat Kutna, and between the latter and Al Gherif bank, there are said to be intricate channels between sand-banks and dangerous patches of sunken rocks leading westward and south-westward to the open sea; but the native pilot refused to take the surveying ship through them. By a single glance at the chart, it will be readily seen that there is no safe or proper channel in this locality that ships should attempt; see also Capt. Elwon's remarks on this subject at page 315.

Hali point bears S.S.E. ½ E. 8 miles from Ras Abu Kalb. The coast reef midway between these two points extends about a mile off-shore, and there is a depth of 4 fathoms close to it. Hali point is bordered by an extensive reef, and there are some shoal patches extending in a westerly and south-westerly direction outside this reef. There are no houses to be seen, but a town or village is said to be not far inland.

Anchorage.—There is anchorage westward of Hali point, in 6 or 7 fathoms, but it is rather exposed. There is good anchorage in the bay, of which Hali point is the West extreme, in 5 to 7 fathoms, well sheltered from northerly and easterly winds, the shore being bordered by

See charts, Nos. 8c and 8d.

reef. On the eastern side of this bay is Bu-Jama where there is neither house nor hut.

The Coast from Hali point to Khor Nohud, 22 miles distant, has a general S.S.E. direction, but in the interval are several bays in which anchorage may be obtained. From Hali point to Umek the shore is bordered by reef and is much indented. From Umek to Nohud the coast line is nearly straight, and there is no coast reef. In the neighbourhood of Khor Nohud and El Birk, the range of hills converges towards the coast, the tops resembling the roof of a barn. Amongst these there are two larger than the rest called by the natives Jebel Tusi Sham and Jebel Tusi Yemeni, or the woman's breasts. From El Birk they appear in the northernmost part of the range of hills, and then may be better known by a detached piece of land to the southward, showing more like a barn than either of them. Shifting peak is in the second highest range of mountains westward of Napúd hills, and is very conspicuous when seen from the northward.

Jahfuf bay, about 7 miles south-eastward from Hali point, affords good shelter from northerly and easterly winds, the depths being 5 to 8 fathoms. There is neither house nor hut at this place.

Khor Umek is 10 miles S.E. $\frac{1}{2}$ S. from Hali point, and is an inlet between two prongs of the coast reef which extend to the southward. There are no houses nor huts to be seen, nor can fresh water be procured at the place. There is anchorage in the khor in from 6 to 8 fathoms, but the space is rather small. There is a depth of 12 feet on the reef enclosing the khor.

Between Khor Umek and Khor Nohud, $12\frac{1}{2}$ miles farther southward, there is no coast reef until in the immediate vicinity of the latter khor.

UMM KERKAN is a bank lying parallel with the shore between Umek and Nohud, forming the western side of the Inner channel, which is here little more than a mile wide. The northern end of this rocky bank is 3 miles southward of Umek; from thence it extends 6 miles southward, and is from $1\frac{1}{2}$ to 2 miles wide. Its northern part is rocky, shallow, and uneven; on the southern part the water is deeper. The mid-channel depth between this bank and the coast is about 20 fathoms, but there are two shallow patches between it and the shore abreast of the northern end of the shoal.

Shoals.—At $1\frac{1}{2}$ miles northward of the northern end of Umm Kerkan, and $1\frac{3}{4}$ miles from the shore, there is a 2-fathoms shoal. Another 2-fathoms shoal lies N.W. by W. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles from the northern end of Umm Kerkan; there are 13 fathoms water between the two.

See chart, No. 8d.

Khor Nohud, in lat. $18^{\circ} 16' N.$, is a good inlet in which anchorage may be obtained in 5 or 6 fathoms. The coast near it is low, sandy, and fronted by coral. Opposite Nohud, the Inner channel is $1\frac{1}{2}$ miles wide between the coast reef and the bank which extends eastward from Jezirat Marka.

HADARA ISLANDS and BANK.—These islands are on a crescent-shaped rocky bank about 7 miles long, the northern extreme of the bank being in lat. $18^{\circ} 26' N.$, and its south-eastern extreme nearly 4 miles westward of Umm Kerkan. The islands are low, sandy, and covered with bushes. About a mile eastward from the eastern end of the Hadara islands there is a one-fathom patch.

Kad Hadara, off the northern end of the Hadara bank, is a low sandy island on a reef lying north-west and south-east. Between this island and the bank, there is a channel with from 14 to 23 fathoms water. Nearly three miles eastward of Kad Hadara is a similar island on a reef which extends a short distance north-westward from it. Nearly 2 miles E.S.E. from this island is a patch of 2 fathoms, already mentioned, and half a mile S. by W. from the same island is another patch with from one to 3 fathoms, and with a 17-fathoms channel between.

Al Gherif is an extensive rocky bank full of dangerous patches; it is upwards of 8 miles in length, north and south, and 4 miles in breadth; it lies 5 or 6 miles south-westward of the Hadara bank, and W.N.W. 8 miles from Jezirat Marka.

JEZIRAT MARKA, in lat. $18^{\circ} 13\frac{1}{2}' N.$, is a low sandy island with a large reef round it, which is connected with an extensive bank of rocks and sand forming the western side of the Inner channel. About $10\frac{1}{2}$ miles S.S.E. $\frac{1}{2}$ E. from Marka is a rocky patch on the southern end of this bank; and, about one mile S.E. from the rocky patch and 4 miles from the coast reef is another patch of 7 fathoms, with 30 fathoms and upwards between it and the coast reef. From the rocky patch, the eastern edge of the bank extends N. $\frac{1}{2}$ E. about 12 miles, narrowing the Inner channel from 4 miles at its southern end to $1\frac{1}{2}$ miles at its northern end, westward of Nohud, where the bank terminates.

The southern end of the bank is narrow; but eastward of Marka its breadth increases suddenly, the eastern edge being nearly 6 miles from that island. The depths on it are various and irregular—from 2 to 30 fathoms—the former depth being found $3\frac{1}{2}$ miles N.E. by E. $\frac{1}{2}$ E. from Marka; there are also 4 fathoms 5 miles eastward of Marka and at 2 miles northward of the rocky patch at the southern end, with 14 fathoms between.

See chart, No. 8d, and plan of Khor Nohud.

About $2\frac{1}{2}$ miles westward of the southern end of this bank is a rocky bank 3 miles long in a N.N.W. and S.S.E. direction, with from 4 to 13 fathoms on it.

About 2 miles northward of Jezirat Marka bank is the southern end of Umm Kerkan bank, already described. The depth in the channel between them being from 16 to 30 fathoms.

The Coast from Khor Nohud to Khisá trends S.S.E. about 22 miles and is fringed by reef, which in some places extends about 3 miles from the shore. The reefs extend in long arms to the southward, between which and the adjacent portions of the coast reef there are several inlets or khors, in which shelter may be obtained.

Khor el Birk, just southward of Khor Nohud, runs some distance inland to the northward, the western side of the entrance being partly formed by a portion of the coast reef extending southward about a mile from a projecting part of the coast. Here a vessel may find good shelter from all winds. In the entrance is a shoal patch, the least water found on it being 4 fathoms; within are 5 fathoms, mud. There are here the remains of a strongly built wall of unhewn stone, but no houses. Shifting peak bearing E. $\frac{1}{2}$ S. leads to the entrance of khor El Birk.

Water.—There are some wells of good water at khor El Birk near the shore, where there are some date trees.

Hasr island is a low wooded island surrounded by reef; it lies S. by E. 7 miles from khor Nohud, and is one mile from the shore.

Anchorage.—The reefs about Hasr island, and northward of it, extend about 3 miles from the shore, the breaks in them forming inlets both northward and southward of that island, with good anchorages, which will be better understood by referring to the chart than by any description which can be given.

Abu-l-Mahlef island, $2\frac{1}{2}$ miles S.E. of Hasr island, is on the coast reef and separated from the shore by a narrow channel. It is small and wedge-shaped in appearance. The reef extends westward 2 miles from Abu-l-Mahlef, from whence it bends to the S.E. leaving an inlet westward of Dahban $1\frac{1}{2}$ miles deep in a N.N.W. direction, in which it is not advisable to anchor with southerly winds. Westward of Abu-l-Mahlef, in a bight of the reef, good anchorage with protection from a southerly wind may be obtained in about 7 fathoms water.

North el Wasm and **South el Wasm**, two small khors in about lat. $18^{\circ} 0' N.$, and 2 miles apart, afford good anchorage and protection from wind, but it would be difficult to get out of the latter with a southerly breeze under sail alone.

See chart, No. 8d.

North el Wasm has a bar of sand across the entrance, which connects the shore reef with a shoal on the northern part of the entrance. The least water found on the bar was $2\frac{1}{2}$ fathoms; within it there were 6 and 7 fathoms, mud. The remarkable hummocks between these anchorages will direct to either of them; these are three steep and lofty hills, in line when bearing East, the anchorages lying southward and northward of this line. The outer or westernmost hill is called Wasm, the inner one the third hummock, and the centre one the fourth.

Khisá is a small Bedouin village on the coast, in lat. $17^{\circ} 56' N.$

KOTUNBUL ISLAND, 2 miles South of Khisá and 2 miles distant from the nearest part of the mainland, is about half a mile in length, and rises to a rugged peak like a wedge 400 or 500 feet high, with a steep ascent on its northern side, the only accessible part. The summit is only a few yards in length and very narrow, declining perpendicularly on the South and West, but on the East with a steep slope.

The character of the rocks on the island is volcanic; but there is no appearance of eruptions having taken place for many years. A reef extends half a mile southward from Kotunbul.

There are 12 fathoms between Kotunbul and the mainland. About 3 miles S. by E. from Kotunbul and $3\frac{1}{2}$ miles westward of Widan, is a patch having 30 fathoms round it.

SIMER ISLAND, its centre in lat. $17^{\circ} 47\frac{1}{2}' N.$, long. $41^{\circ} 22\frac{1}{2}' E.$, bears W. by S. $\frac{3}{4}$ S. 16 miles from Kotunbul island. It is $1\frac{1}{2}$ miles in length, east and west, and half a mile wide; it is very low, consists of coral and sand, and is principally covered with decayed wood.

Shoal.—There is a shoal northward and north-eastward of Simer island, 5 miles in length and nearly 3 miles wide; the soundings obtained on it are from 3 to 19 fathoms, but there may be spots with less. On its western edge are 13 fathoms, mud, gradually increasing to the north-west, but a rocky patch lies about one mile from the centre of its western edge. The shoal commences $1\frac{1}{2}$ miles north-eastward of Simer, and there is 50 fathoms midway between them. N.E. 6 miles from the island there is a rocky patch. There are also two small rocky patches $3\frac{1}{2}$ miles S.E. from the island, and two shoal patches of 3 and 4 fathoms about 4 miles south-westward of it.

Anchorage.—The soundings are deep round Simer island; but if anchorage is required, it may be conveniently obtained either upon or on the western edge of the large shoal north-eastward of it.

Reefs.—About 10 miles S.S.W. from Kotunbul island, and the same distance S.W. from Widan, the nearest point on the mainland, is a rocky shoal about $1\frac{1}{2}$ miles long; and one mile south-eastward of it a rocky

See chart, No. 8d.

patch, with 19 fathoms between, and 30 fathoms at one mile north-eastward of them. Nearly 2 miles southward of the large reef there is a 4-fathoms patch.

MAMALI REEFS.—**Mamali Kebir**, the northern point of which is in lat. $17^{\circ} 39'$ N., and 12 miles distant from the shore, is a shoal and rocky bank full of patches, having deep water between them. It is 9 miles long N.W. by W. and S.E. by E., and 5 miles wide at its north-western end, but narrows to $1\frac{1}{2}$ miles towards its south-eastern end.

Mamali Seghir is a narrow coral reef, over which the sea breaks in some parts, extending about 10 miles in a N. by W. $\frac{1}{2}$ W. and opposite direction.

Matbakhein, near the northern extreme of Mamali Seghir, in lat. $17^{\circ} 28'$ N., long. $41^{\circ} 45'$ E., is a rock about 15 or 20 feet above water.

One mile south of the southern extreme of Mamali Seghir is a rocky patch with 47 fathoms between the two; and, from $3\frac{1}{2}$ to 5 miles eastward from the same extreme, there is a group of three rocky patches in line, East and West.

About 13 miles E. by S. $\frac{1}{2}$ S. from Matbakhein rock, and the same distance from the shore, is a 3-fathoms patch, having from 33 to 36 fathoms close to it.

Rocky banks.—About 9 miles distant in an E. by S. $\frac{1}{2}$ S. direction from the southern end of Mamali Seghir, there is a rocky bank about 3 miles long S.E. by E. and N.W. by W., and about 2 miles wide, having depths of 3 and 4 fathoms.

Another rocky bank 2 miles long, N. by W. and S. by E., one mile wide, and having as little as 2 fathoms, lies E.S.E. $1\frac{1}{2}$ miles from the bank last mentioned. A 2-fathoms patch, having 18 and 35 fathoms close to, lies $1\frac{1}{2}$ miles north-eastward of the eastern rocky bank.

Firán island, in lat. $17^{\circ} 10'$ N. and $6\frac{1}{2}$ miles from the shore, is on the western side of the Inner channel. The island is less than a mile in extent but covered with trees and bushes; its highest part forms a steep bluff to the westward, 60 feet above the level of the sea. A small bank extends from the northern side of the island, but it is bad holding ground; a reef projects from the south-eastern point.

North Ghorab island, W. by S. $\frac{3}{4}$ S. 9 miles from Firán, is rather high, little more than half a mile in length, and has a small black rock off its northern end. North Ghorab island is on the western end of a bank of irregular depth about 5 miles long W.N.W. and E.S.E. and 3 miles wide. The soundings on the bank are from 6 to 20 fathoms, rocks and sand. There is a good and deep channel between Firán and North Ghorab.

SHURA ISLAND is 9 miles S.S.E. from Firán, and 3 miles W. by N. $\frac{1}{2}$ N. from the nearest part of Ras Turfa. It is a small sandy island about 20 feet high covered with bushes, and is at the south-eastern end of a bank of rocks and sand, which extends W.N.W. nearly 7 miles from the island. There are from 2 to 12 fathoms on the bank, some of the shoalest patches being near the north-western end.

Channels.—Between Shura island and Ras Turfa, there is a channel $2\frac{1}{2}$ miles wide, with a least depth of 7 fathoms. Between Shura and North Ghorab banks, there is a 38-fathoms channel 3 miles in width.

The Coast.—From Khisá to Ras Turfa.—Widan is 7 miles south-eastward of Khisá; at this place, a narrow neck of land projects from the coast forming a semicircular bay three-quarters of a mile wide, affording anchorage, but with good protection from southerly winds only; the depths within are 3 and 4 fathoms. As seen from the westward, this point of land has the appearance of an island. There are no buildings nor fresh water but cattle are plentiful.

Jebel Bakara is a high hill close to the sea on the northern side of Widan anchorage, and Jebel Rakebat Khudair is a high hill ending in a cape to the southward; neither of these are shown on the chart. Jebel Widan lies 5 miles E. by N. $\frac{1}{2}$ N. from Widan, and 6 miles S.E. $\frac{1}{2}$ S. from it is Jebel Husna-l-Majis with a fort on its summit; this hill fort is about 2 miles inland from the little khor of El Makra, a small inlet 8 miles south-eastward of Widan.

El Majis, 12 miles S.E. $\frac{1}{2}$ E. from Widan, is a small but well-peopled Bedouin village, off which the coast reef projects nearly three quarters of a mile, in a break of which to the northward is the little khor El Makra just mentioned.

KIYAS.—About 9 miles S.E. from El Majis is Kiyas, off which is a reef 2 miles long and about one mile from the shore, with 2 and 3 fathoms between it and the shore. Nearly 4 miles westward of Kiyas is a patch of rocks having a depth of 4 fathoms.

Kutuf el Misri and Shukeik lie between El Majis and Kiyas at $3\frac{1}{2}$ and $6\frac{1}{2}$ miles respectively from the former. Anchorage may be found off both these places.

Khor el Etwid, S.E. $8\frac{1}{2}$ miles from Kiyas, has from one to 2 fathoms inside. There is a shoal a mile long off the entrance, with 3 fathoms between it and the shore; and 2 miles W. by N. from the entrance and one mile off-shore, is a patch of rocks having a depth of 6 feet. There is a depth of 5 fathoms just outside this patch, but another patch with 4 fathoms lies $1\frac{1}{4}$ miles N.W. by W. from it. The village of Etwid is 5 or 6 miles inland.

Jebel Etwid is a very remarkable peak bearing N.E. 10 miles from the entrance of Khor el Etwid, and easily known as it appears quite unconnected with the range of hills in the neighbourhood, and is much nearer to the shore.

Shab Abu-l-luka is a portion of the coast reef, extending north-westward from the point of that name, which point is $8\frac{1}{2}$ miles south-eastward of Khor el Etwid.

From point Abu-l-luka as far as Ras Turfa, 28 miles distant, the coast has a southerly direction, and with the exception of Shab el Kebir is clear of coast reefs.

Shab el Kebir is a part of the coast reef, the centre of which, 6 miles southward of point Abu-l-luka, projects $1\frac{1}{2}$ miles from the shore and gradually tapers away to the northward and southward. Shab el Kebir is about 9 miles long.

RAS TURFA.—**Khor Abu-s-saba.**—Ras Turfa, in lat. $17^{\circ} 0' N.$, long. $42^{\circ} 18\frac{1}{4}' E.$, is the southern extreme of a narrow neck of low land covered with bushes, on the eastern side of which the Khor Abu-s-saba runs in about 13 miles to the northward, but for 9 miles from its head appears to be entirely choked by shoals, as is its eastern side throughout. A reef extends a short distance off the south-eastern part of Ras Turfa, but there is good anchorage eastward of the Ras in the outer part of the Khor in from 8 to 4 fathoms water. At $1\frac{1}{2}$ miles northward of Ras Turfa, in the Khor, there is a small island, southward of which there is a bight, fit only for boats but with 6 fathoms water.

Ferafer island is a narrow, low, and sandy island in front of the entrance to Khor Abu-s-Saba, its western end bearing E.S.E. $1\frac{1}{2}$ miles from Ras Turfa, and, from that end, it extends $2\frac{1}{2}$ miles in an E.S.E. direction; from a distance it appears as three islands. The anchorage under Ras Turfa may be entered under either end of the island, but, if round the eastern end, caution is necessary, as the coast reef approaches the island within $1\frac{1}{2}$ miles, and there are shallow soundings of 2 and 3 fathoms along the northern shore of the island.

The Inner channel lies between Ras Turfa and Shura island, and is $2\frac{1}{2}$ miles wide at this part. It would be well to give a berth of one mile n passing this cape.

Anchorage.—From Widan to abreast of Firán island, there is anchorage all along the shore, off the places already enumerated, and as given in the chart. Along this part of the coast there are said to be many small villages a few miles inland.

Abu Shukar island lies $6\frac{1}{2}$ miles S.W. from Ras Turfa, and between them there is a channel 5 miles wide and from 20 to 30 fathoms

deep. Abu Shukar is a small island composed of branching coral, cracked and broken into numerous pieces, forming deep clefts through some of which the water passes, while others are filled with sand and earth where some jungle trees have sprung up.

Abu Shukar bank, on the north-eastern part of which stands the island from which the bank is named, is of triangular shape about 8 miles long north-west and south-east, and $4\frac{1}{2}$ miles wide. On this bank are five islands besides Abu Shukar. At the south extreme is Seil Shertaf, about half a mile in length; about $1\frac{1}{4}$ miles north-eastward of the latter is Dhu Raji island, having 30 fathoms near its south-eastern side. The other three islands lie N.N.W. of Seil Shertaf. The soundings on Abu Shukar bank are very irregular, varying from 17 to 3 fathoms.

Jezirat Hibar, $7\frac{1}{2}$ miles S. by E. $\frac{1}{4}$ E. from Ras Turfa, is about half a mile square and surrounded by a reef.

Umm el Kura.—Umm el Karib.—At 3 miles S.S.E. from Jezirat Hibar, there is a cluster of five islands on a sand and coral bank. Umm el Kura is the north-western one, and Umm el Karib the north-easternmost. N.N.W. upwards of a mile from Umm el Kura there is a one-fathom patch, and there is a sunken patch at the same distance south-westward of the island.

Amina island is one mile southward of the Umm el Kura group and has a small island about a quarter of a mile southward of it; a rock lies about a mile East from the northern end of Amina, and a 5-fathoms patch 2 miles eastward of the small island.

The narrowest part of the Inner channel between Umm el Karib and the shore reef off Gizan is 4 miles wide, with from 9 to 14 fathoms, and between Jezirat Hibar and a 3-fathoms patch north-eastward of it, it is 3 miles wide. Jezirat Hibar is about 7 miles West from Gizan.

Kadheiya, Jaferi, and Dahret Jaferi are three little islands on the western side of the Inner channel 5 miles distant from the shore reef, the depths from the islands towards the shore reef decreasing from 12 to 2 fathoms. Kadheiya and Jaferi are both on one bank upwards of 2 miles long north and south by $1\frac{1}{2}$ miles wide, with from 2 to 3 fathoms between them. Dahret Jaferi is surrounded by a separate reef, and there are 10 fathoms between it and the others. These islands may be passed on either side.

Ashik island and bank.—S. by E. 20 miles from Jaferi is the small island of Ashik, with two larger ones in a N. by W. direction from it, at distances of 7 cables and 2 miles respectively. These islands are on a narrow bank which extends about N. by W. 7 miles from Ashik and $1\frac{1}{2}$ miles southward from it, the northern part having from 2 to 5 fathoms water. Between this bank and the coast reef, the channel is from 4 to

5 miles wide, with from 8 to 12 fathoms in it; the bank, like Towak island, 3 miles southward of Ashik, may be passed on either side.

The Coast.—From Ras Turfa to Ras Musaghib, the distance is 52 miles in a S.S.E. direction, but from Ras Turfa the coast falls back eastward nearly 10 miles, forming the deep bight of Karn-el-Wadah; from whence, its trend to Ras Musaghib is about S. by E. The shore for the whole distance is bordered by reef, and from the town of Gizan for 40 miles in a southerly direction the land is covered with jungle, and is without villages or any inhabitants. Northward of Gizan, the coast line is flat and sandy; whilst, southward, it consists of rocky cliffs.

Karn-el-Wadah is the deep bight eastward of Ras Turfa, and bears E.N.E. from the eastern end of Ferafer island; it has from 6 to 8 fathoms water in the outer part, but the coast reef in this part extends about 2 miles off-shore.

GIZAN.—The town of Gizan, S.E. $\frac{1}{2}$ E. 12 miles from Ras Turfa, has a few square stone buildings, but the principal part consists of grass huts, mostly round with pyramidal tops. It has a large fort on its southern side in a state of decay, and a small bazaar scantily supplied with such dry provisions as the natives use; fresh meat and vegetables can be procured by giving a day's notice. Water is very scarce. The population of Gizan in 1834 was about 400, employed chiefly, as it still is, in the pearl fishery on the banks in its neighbourhood.

Gizan hills, which cannot be mistaken, are a good landmark; they are close behind the town, and have no other high land near them. The shore reef projects considerably about Gizan, and the soundings are irregular inside a depth of 6 or 7 fathoms.

Shoals.—There is a sandy 2-fathoms patch with 6 fathoms close outside it S.W. $\frac{1}{2}$ S. $1\frac{3}{4}$ miles from the fort; and, when on the patch, a small white mosque in the town is in line with a remarkable rock on a hill behind it. There is also a shoal bank of 3 and 4 fathoms, the shallowest part bearing N.W. by W. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles from the fort; the bank is about a mile long in a north-west and south-east direction, and lies directly in the route of a vessel rounding Ras Turfa and steering for Gizan anchorage.

The Anchorage is in 7 fathoms, about 2 miles off-shore, with the fort bearing E. by N. There is also an anchorage in $3\frac{1}{2}$ or 4 fathoms about a mile off-shore, at a short distance from a rocky spot which forms an inner anchorage for small boats off the town.

Karn esh Shurra, $3\frac{1}{2}$ miles S.S.E. $\frac{1}{2}$ E. from Gizan, is a bushy point bordered by the coast reef.

RAS MUSAGHIB is in lat. $16^{\circ} 14' N.$; from Karn esh Shurra, the coast has a general S. by E. direction to Ras Musaghib, bordered

See chart, No. 8d, with plan of Gizan.

throughout by reef about a mile wide, but which at Ras Musaghib extends 2 miles off-shore.

From Ras Musaghib southward to Loheiya, a distance of 32 miles in a S. by W. direction, the coast forms a slight indentation, and is skirted by reef of an average width of one mile; but, in a small bay 3 miles north-eastward of Loheiya, the reef stretches right across the entrance at a distance of 2 miles from the shore. Near the northern point of this bay is a small island a mile from the shore, and, one mile northward of it and $1\frac{1}{2}$ miles from the shore, is a reef distinct from the coast reef. From Ras Musaghib southward to this bay, the soundings in the Inner channel are very regular, from 4 to 7 fathoms everywhere within a mile of the coast reef.

In continuation of the description of the Inner channel, we now return to the islands and reefs forming its western side at the point reached on the preceding page.

Towak island, in lat. $16^{\circ} 18' N.$, bears S.S.E. 3 miles from Ashik island, and is about $3\frac{1}{2}$ miles from the nearest part of the coast reef. A reef extends 2 cables from the eastern side of this island.

Oreste shoal, on which the Austro-Hungarian steam-vessel *Oreste* struck in 1876, is said to lie about N.E. 2 miles from Towak island; it has 13 feet water and is about a cable in length east and west. This bearing and distance place the shoal about $2\frac{1}{2}$ miles from the mainland.

Umm el Hommadh island, $5\frac{1}{2}$ miles W. $\frac{1}{2}$ S. from Towak, is a small coral island about $1\frac{1}{2}$ miles inside the edge of the bank which bounds the western side of the Inner channel. Another small island also on the bank lies close northward of Umm el Hommadh; there are also two rocky patches in its vicinity, one at $1\frac{1}{2}$ miles eastward of Umm el Hommadh; the other, half a mile north-eastward of the same.

South Ghorab island, small, low, and sandy, is also on the bank which bounds the western side of the Inner channel and about 2 miles within its eastern edge. From South Ghorab island, the same bank projects as a long rocky tongue $5\frac{1}{2}$ miles in a N. by E. direction, having 3 fathoms at its northern extreme, but leaving a channel of from 11 to 14 fathoms depth, and $3\frac{1}{2}$ miles wide, between it and Towak island. The northern point of this reef is exactly off Ras Musaghib, and, between it and the coast reef, the width of the Inner channel near South Ghorab island and Ras Musaghib thus becomes contracted to about $2\frac{1}{2}$ miles.

Baas island is a small, low, sandy island on the southern end of the same reef as South Ghorab island, from which it is distant 8 miles in a S. by E. direction. Northward of Baas, are the two small sandy islands Esh Shaban and Uwaf. Half a mile southward of Baas there is a one-fathom patch and also a patch on a point of the reef W.N.W. 2 miles from

the same island. The Inner channel abreast of Baas is 5 miles wide, with depths of from 12 to 5 fathoms, the deepest water being here, as in most parts, on the western side of the channel.

South Ghorab, Abu Shejer, with a small island a mile eastward of it, Uwaf, and Esh Shaban, as well as Baas, are all low, sandy islands on the inner part of the outer bank or reef; between and northward of them are many dangerous patches, rendering it unsafe to attempt passing over the bank in this neighbourhood.

Nasib shoal, on the north-western end of which is an islet $3\frac{1}{4}$ miles S.W. by S. from Baas island, is about 2 miles long in a north-west and south-east direction, and besides the small patch above water near its north-western end, is nearly dry in other parts.

Dahayir island is a small sand-bank $2\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from the south-eastern end of Nasib shoal, and S.S.E. of it are two others of the same description, the whole occupying a space of 2 or 3 miles, and each of them surrounded by a reef. There is a narrow passage between Dahayir island and the other two, but it is better to pass either eastward or westward of the whole group.

The rocky patch already mentioned as lying $1\frac{1}{2}$ miles from the nearest part of the coast at the northern point of the small bay northward of Loheiya, bears S.E. $\frac{1}{4}$ E. $3\frac{1}{4}$ miles from the eastern islet of the Dahayir group. The Inner channel here is, therefore, barely three miles wide, and the depths are from 6 to 3 fathoms.

Zurbat, Ajusak, and Dorama islands are on the eastern edge of a narrow and shoal bank about 8 miles long, with 4 or 5 fathoms close to its eastern side. The North extreme of Zurbat is 4 miles W.N.W. from Dahayir.

HAMAR ISLAND, about 4 miles north-westward of Loheiya, is low, nearly 3 miles in length, north-east and south-west, three-quarters of a mile wide, and has one or two fishing huts on its western side. There is a small bight in the reef off its north-eastern part, affording anchorage for small boats. The island is fringed by reef on both sides, which also extends off the south-western end nearly a mile towards the eastern part of Bawarid island; therefore, when passing between it and Bawarid, keep nearest to the latter. Firewood may be had for the cutting on Hamar, but no water.

Bawarid island is about $1\frac{1}{2}$ miles long, low, and is on the eastern extreme of a bank with from 5 to 8 fathoms water over it, which extends in an easterly direction from Entufash island, described at page 332. Bawarid is distant from Hamar island $2\frac{3}{4}$ miles in a south-westerly direction, and between them there is a 12-fathoms channel.

Urmek island, 5 miles south-westward of Loheiya, is about $2\frac{3}{4}$ miles long east and west, and one mile wide. It is low and sandy, and has on it a fishing village, but is destitute of water, which has to be supplied from Loheiya. In the centre of the north-eastern and south-western sides are two small white mosques; that on the south-western side is used as a mark for the anchorage at Loheiya. Between the easternmost point of the island reef and the extensive reef off the coast, the Inner channel is not three quarters of a mile wide, and the depth from 5 to 7 fathoms.

Shoal.—At $2\frac{1}{2}$ miles N.E. $\frac{3}{4}$ N. from the north-western end of Urmek island there is a one-fathom patch which should be avoided by keeping over towards Bawarid island.

LOHEIYA, on the mainland, in lat. $15^{\circ} 42' N.$, is on the northern side of a small shallow bay eastward of the islands last described. The distant land behind Loheiya is high and mountainous, but so distant as to be seldom seen. Behind the town (a collection of miserable looking straw huts) are a few hills, but the highest, on which the fort stands, is not more than 150 feet above the level of the sea. Sugarloaf is the northernmost of two small peaks eastward of Loheiya. Jebel Kusha, or Barnhill, is an oblong piece of land south-eastward of Loheiya, appearing somewhat like a barn.

The town of Loheiya is under a Turkish governor; the trade is principally in grain and coffee, and a considerable traffic is carried on by dhows between this town, Jidda, Hodeida, and Aden. In 1881, its population was estimated at 2,000, including its garrison of about 120 Turkish soldiers and a few British Indian subjects, but no Europeans. There is telegraphic communication between Loheiya and Hodeida.

Supplies.—A few sheep may occasionally be obtained. Water is scarce and brackish.

Reefs.—There is a narrow rocky reef $1\frac{1}{4}$ miles westward of Loheiya about 2 miles in length north and south, and two rocky one-fathom patches about a mile westward of it, with $3\frac{1}{2}$ and 4 fathoms near them.

The western point of Loheiya bay has a rocky reef extending $2\frac{1}{2}$ miles south-westward from it and to within $1\frac{1}{4}$ miles of the eastern end of Urmek island; the harbour or anchorage and the passage up to the town lie between this long spit and the reef which occupies the whole of Loheiya bay.

Anchorage.—Depths.—The best anchorage for large vessels is about 4 or 5 miles from Loheiya, in from 7 to 9 fathoms, N.N.E. of Urmek island. There is anchorage in from $4\frac{1}{2}$ to 3 fathoms fit for small vessels in the entrance of the channel which runs up to the town in a north-easterly direction, and which carries a depth of 6 feet up to the

See chart, No. 143, and plan of Loheiya on chart, No. 8d.

town. The entrance is E. by N. $\frac{1}{4}$ N. from the white mosque on the south-western side of Urmek island, or the first high tower a little northward of Loheiya fort on with the northernmost of two small mounds in line bearing N.E. $\frac{3}{4}$ N. A ship of any size can only go just within the entrance, and is then 3 miles from the town; there are also some dangerous patches about the entrance, and therefore this anchorage cannot be recommended for general use.

Buoy.—A white conical buoy marks a shoal on the eastern side of the entrance; this buoy should therefore be left on the starboard hand in entering, and so long as it is in position, it is a good guide for anchoring.

Tides.—It is high water, full and change, at Loheiya at 1h. 30m.; the rise is about 3 feet.

Directions.—For vessels from the westward bound to Loheiya, two channels are the most easily recognised and most frequented, viz.:—that between Okban and El Bodhi islands, and then between the latter and Kadaman Kebir island, passing eastward of Urmek island, easily known by its white mosque. Then steer for the outer anchorage described, taking care not to approach too near the shallow spit at the eastern end of Urmek island in hauling to the north-westward; and, if bound for the anchorage in the entrance, keeping well to the north-westward to avoid the shore-reefs until the marks, already given for entering, are on.

Kadaman Seghir island.—From the south-western point of Urmek island, Kadaman Seghir is distant 6 miles in a W. by S. $\frac{1}{4}$ S. direction. It is small, low, sandy, and surrounded by a reef.

Kadaman Kebir island is $4\frac{1}{2}$ miles S.W. $\frac{1}{4}$ S. from the nearest part of Urmek island. From its western end, a reef extends W.S.W. nearly $1\frac{1}{2}$ miles, and has 5 fathoms water at its extreme. There is a 3-fathoms patch about West 2 miles from Kadaman Kebir.

A reef, upon which the S.S. *Chatham*, drawing 12 feet of water, struck in April 1899, lies about 2 miles eastward of Kadaman Kebir island in the northern approach to Kamaran bay.

Shab Badinjan.—About $4\frac{1}{2}$ and $5\frac{1}{2}$ miles S.S.E. from Urmek island, and 2 and 3 miles off Ras Haram, are the two small shoals which together form Shab Badinjan. At 10 miles S.S.E. $\frac{1}{4}$ E. from Urmek is another small shoal 3 miles from the shore. These shoals may all be seen by a good look-out and passed on either side, though it is as well to pass westward of them in going from Kamaran bay through the Inner channel to Loheiya or the contrary.

KAMARAN ISLAND.—The northern point of this island, (~~now British possession~~) is nearly 10 miles South of the mosque on the

See charts, Nos. 143, and 8d with plan of Loheiya.

south-western side of Urmek island ; from thence it extends in a S. by W. direction 12 miles, and is at the northern end less than 2 miles wide, but for the greater part about 4 miles in width. The island is composed of hard rock intermixed with sand, and, in some parts, earth capable of cultivation ; there are some spots on which date trees flourish. The island is generally low and sandy in appearance, rising a little towards the southern end, where there are a few hillocks ; on the northern side there is swamp and low scrub. Wood and water may be obtained on the island, and also fish by means of a seine.

In addition to the town of Kamaran there are five small villages on the island ; the total population is about 2,000. The town of Kamaran is largely increasing ; there are several large brick and stone buildings, including condensing and ice-making works, British consul's house, &c. The inhabitants are mostly fishermen, and are also employed in pearl fishing. Mails are sent and received from Hodeida weekly. The officials of the island are the Mudir, captain of the port, and the medical inspector and staff of the lazarette. At Salif, on the opposite side near Jebel Mahasin, are large rock-salt works, the amount exported in 1898 representing a profit of about 10,000*l*.

Except a small portion of its eastern side, the island is bordered by a reef, which is about half a mile wide at 2 miles to the northward of the south-east point. A shoal plateau, however, extends from this south-east point towards Ras el Bayadh for nearly three-quarters of a mile, with $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms on it ; the bottom is hard sand and weed. The reef off Ras el Bayadh is comparatively steep-to. The distance between the 5-fathoms depths in the entrance is narrowed to about 2 cables, these contour lines being about 6 cables from the island side, and about $1\frac{1}{2}$ cables (in the narrowest part) from Ras el Bayadh.

The telegraph huts at the entrance occasionally show up well for 2 or 3 miles in a good light, but otherwise the entrance to the passage is hard for a stranger to make, the small white beacon on Rishah island being almost useless as a landmark.

The tides are strong in the entrance, but set almost straight through. The discolouration of the water at this part is very remarkable, especially to the north-east of Ras el Bayadh when the tide is setting in strong, as there is a perfectly marked line of light and dark water extending northward for sometimes nearly a mile, the light part being right across the channel, and the dark part in Dicno bay. This discolouration is not confined to the entrance, but extends to Rishah island, Arab shoal, and well off Ras Hamara ; the colour gives no indication of the depth, dark-coloured water being found at times on the $2\frac{1}{2}$ -fathoms patch on Arab shoal, and very light-coloured water in 20 fathoms.

See Kamaran bay, plan No. 14.

Supplies.—At the town of Kamaran, beef and mutton can be obtained in small quantities; vegetables are difficult to procure, as they mostly come from Hodeida. During the pilgrim season there is always a good supply of condensed water, and ice, for the use of the pilgrims, the water being conveyed to the lazarette by pipes. It is not advisable to use water from the wells for drinking purposes. Coal cannot be got except by freight steamer from Aden or Perim, which is easily ordered by telegraph.

Telegraphic communication.—The quarantine station at Kamaran bay is connected by a submarine cable and land line with Hodeida, and thus with all parts of the world where lines are laid. The submarine cable crosses from Yemmen on the south point of Kamaran island to Ras el Bayadh; vessels should not anchor on this line.

Beacon.—A square masonry beacon, surmounted with pole and globe, stands at the extreme south-east point of Kamaran island close to the telegraph huts, on the north side of the south entrance to Kamaran bay.

Anchorage.—There is very good anchorage for small vessels in Kamaran harbour in 7 fathoms, mud, with the ruined fort bearing S.W. about 2 cables. The entrance to this harbour is narrow and difficult; it is, however, well buoyed in the pilgrim season, but afterwards the buoys are removed, and the whole place practically deserted except by fishermen. Vessels anchoring in the Quarantine ground, must be careful of the point of reef which runs out about 6 cables from the shore, $1\frac{1}{8}$ miles to the northward of the harbour.

A patch of one fathom is said to exist 5 cables S.E. by E. from the point of the above-mentioned reef, and one of $3\frac{1}{2}$ fathoms at about 7 cables S. $\frac{1}{4}$ W. from it.

There are two piers in the bay next northward of Kamaran harbour, which afford good landing places for boats.

There is another anchorage off the western side of Kamaran island in 4 fathoms, opposite Makram village, known by a few date trees and a small white mosque southward of it. The reef extends a mile off this part, with a small sandy shoal, at times above water, one mile N.W. of the village.

About 3 miles N.W. of Makram is a small sandy island with a reef extending half a mile from its western side, and for a less distance off its eastern end; there is a channel on each side of it.

Quarantine.—Pilgrim vessels from India or other parts beyond the Red sea, if carrying more than 5 pilgrims per 100 tons, have to call at Kamaran and perform a quarantine before proceeding to Jidda. In case of cholera breaking out in Hedjaz, all ships for Yemen, Basra, &c., are required to perform quarantine at this place and to get free pratique before

proceeding to their destination. The Lazarette will accommodate about 6,000 pilgrims, and is available from about 15th November to 9th May.

During the pilgrim season of 1896, 30,386 pilgrims were quarantined at Kamaran, and during 1897, 14,210 pilgrims. In the former season, 43 vessels aggregating 60,452 tons, and during the latter, 32 vessels totalling 45,142 tons, entered and left Kamaran.

Winds and weather.—Southerly winds are almost continuous from October to March, at times blowing very hard, and during these months rain falls five or six times; the whole of this period the climate is very unhealthy, with the wet and dry bulb thermometer standing about the same height. Northerly winds blow from April to September, very hot and dry.

KAMARAN BAY.—From Loheiya southward the shore is bordered by a reef which in some places stretches off upwards of 3 miles. Abreast of the northern end of Kamaran island, where the remarkably fine bay of that name commences, the Inner channel is 5 miles wide. Abreast of Ras Harifi, it is about 4 miles wide; this Ras is the northern extreme of Jebel Mahasin, a high piece of land jutting out into the middle of the bay from the southern shore, and dividing it in two. Jebel Mahasin, 190 feet in height with two small round peaks, may be easily recognised on a fairly clear day as being the highest ground near the coast on the mainland. The mosque and village of Salif are rarely seen until a vessel is inside the entrance. The inner half of the deep bay eastward of Ras Harifi, is occupied by shoals; in its outer half, however, anchorage may be had in from 7 to 4 fathoms, and here firewood may be obtained.

Ras el Bayadh.—From the western point of Jebel Mahasin, Ras el Bayadh bears S.W. 5 miles, the coast between, which is flat and sandy, forming a deep bay to the south-eastward, and then trending about W. by N., and terminating in Ras el Bayadh, the southern point of entrance to Kamaran bay. The Ras is low and sandy, and with a few trees about a mile inland; it is surrounded by a reef. A pole beacon, surmounted by a cage, marks the north-west extreme of Ras el Bayadh.

For the continuation of the coast line to the southward from Ras el Bayadh, *see* page 334.

Depths.—In the northern part of Kamaran passage, the general depths are from 8 to 12 fathoms, mud; in the southern part from 18 to 30 fathoms. From the edge of the island reef a perfectly gradual slope from $2\frac{1}{2}$ to 5 fathoms (with one small patch of $2\frac{1}{4}$ fathoms near outer edge) extends some distance out in the southern entrance; the bottom is hard sand. Off Ras al Bayadh the reef is comparatively steep-to. The best water in the southern entrance is from 6 to 12 fathoms, the greatest depth being towards Ras el Bayadh.

See Kamaran bay, plan No. 14.

the same island. The Inner channel abreast of Baas is 5 miles wide, with depths of from 12 to 5 fathoms, the deepest water being here, as in most parts, on the western side of the channel.

South Ghorab, Abu Shejer, with a small island a mile eastward of it, Uwaf, and Esh Shaban, as well as Baas, are all low, sandy islands on the inner part of the outer bank or reef; between and northward of them are many dangerous patches, rendering it unsafe to attempt passing over the bank in this neighbourhood.

Nasib shoal, on the north-western end of which is an islet $3\frac{1}{4}$ miles S.W. by S. from Baas island, is about 2 miles long in a north-west and south-east direction, and besides the small patch above water near its north-western end, is nearly dry in other parts.

Dahayir island is a small sand-bank $2\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from the south-eastern end of Nasib shoal, and S.S.E. of it are two others of the same description, the whole occupying a space of 2 or 3 miles, and each of them surrounded by a reef. There is a narrow passage between Dahayir island and the other two, but it is better to pass either eastward or westward of the whole group.

The rocky patch already mentioned as lying $1\frac{1}{2}$ miles from the nearest part of the coast at the northern point of the small bay northward of Loheiya, bears S.E. $\frac{1}{4}$ E. $3\frac{1}{4}$ miles from the eastern islet of the Dahayir group. The Inner channel here is, therefore, barely three miles wide, and the depths are from 6 to 3 fathoms.

Zurbat, Ajusak, and Dorama islands are on the eastern edge of a narrow and shoal bank about 8 miles long, with 4 or 5 fathoms close to its eastern side. The North extreme of Zurbat is 4 miles W.N.W. from Dahayir.

HAMAR ISLAND, about 4 miles north-westward of Loheiya, is low, nearly 3 miles in length, north-east and south-west, three-quarters of a mile wide, and has one or two fishing huts on its western side. There is a small bight in the reef off its north-eastern part, affording anchorage for small boats. The island is fringed by reef on both sides, which also extends off the south-western end nearly a mile towards the eastern part of Bawarid island; therefore, when passing between it and Bawarid, keep nearest to the latter. Firewood may be had for the cutting on Hamar, but no water.

Bawarid island is about $1\frac{1}{2}$ miles long, low, and is on the eastern extreme of a bank with from 5 to 8 fathoms water over it, which extends in an easterly direction from Entufash island, described at page 332. Bawarid is distant from Hamar island $2\frac{3}{4}$ miles in a south-westerly direction, and between them there is a 12-fathoms channel.

Urmek island, 5 miles south-westward of Loheiya, is about $2\frac{1}{4}$ miles long east and west, and one mile wide. It is low and sandy, and has on it a fishing village, but is destitute of water, which has to be supplied from Loheiya. In the centre of the north-eastern and south-western sides are two small white mosques; that on the south-western side is used as a mark for the anchorage at Loheiya. Between the easternmost point of the island reef and the extensive reef off the coast, the Inner channel is not three quarters of a mile wide, and the depth from 5 to 7 fathoms.

Shoal.—At $2\frac{1}{2}$ miles N.E. $\frac{3}{4}$ N. from the north-western end of Urmek island there is a one-fathom patch which should be avoided by keeping over towards Bawarid island.

LOHEIYA, on the mainland, in lat. $15^{\circ} 42' N.$, is on the northern side of a small shallow bay eastward of the islands last described. The distant land behind Loheiya is high and mountainous, but so distant as to be seldom seen. Behind the town (a collection of miserable looking straw huts) are a few hills, but the highest, on which the fort stands, is not more than 150 feet above the level of the sea. Sugarloaf is the northernmost of two small peaks eastward of Loheiya. Jebel Kusha, or Barnhill, is an oblong piece of land south-eastward of Loheiya, appearing somewhat like a barn.

The town of Loheiya is under a Turkish governor; the trade is principally in grain and coffee, and a considerable traffic is carried on by dhows between this town, Jidda, Hodeida, and Aden. In 1881, its population was estimated at 2,000, including its garrison of about 120 Turkish soldiers and a few British Indian subjects, but no Europeans. There is telegraphic communication between Loheiya and Hodeida.

Supplies.—A few sheep may occasionally be obtained. Water is scarce and brackish.

Reefs.—There is a narrow rocky reef $1\frac{1}{4}$ miles westward of Loheiya about 2 miles in length north and south, and two rocky one-fathom patches about a mile westward of it, with $3\frac{1}{2}$ and 4 fathoms near them.

The western point of Loheiya bay has a rocky reef extending $2\frac{1}{2}$ miles south-westward from it and to within $1\frac{1}{4}$ miles of the eastern end of Urmek island; the harbour or anchorage and the passage up to the town lie between this long spit and the reef which occupies the whole of Loheiya bay.

Anchorage.—Depths.—The best anchorage for large vessels is about 4 or 5 miles from Loheiya, in from 7 to 9 fathoms, N.N.E. of Urmek island. There is anchorage in from $4\frac{1}{2}$ to 3 fathoms fit for small vessels in the entrance of the channel which runs up to the town in a north-easterly direction, and which carries a depth of 6 feet up to the

See chart, No. 143, and plan of Loheiya on chart, No. 8d.

town. The entrance is E. by N. $\frac{1}{4}$ N. from the white mosque on the south-western side of Urmek island, or the first high tower a little northward of Loheiya fort on with the northernmost of two small mounds in line bearing N.E. $\frac{3}{4}$ N. A ship of any size can only go just within the entrance, and is then 3 miles from the town; there are also some dangerous patches about the entrance, and therefore this anchorage cannot be recommended for general use.

Buoy.—A white conical buoy marks a shoal on the eastern side of the entrance; this buoy should therefore be left on the starboard hand in entering, and so long as it is in position, it is a good guide for anchoring.

Tides.—It is high water, full and change, at Loheiya at 1h. 30m.; the rise is about 3 feet.

Directions.—For vessels from the westward bound to Loheiya, two channels are the most easily recognised and most frequented, viz.:—that between Okban and El Bodhi islands, and then between the latter and Kadaman Kebir island, passing eastward of Urmek island, easily known by its white mosque. Then steer for the outer anchorage described, taking care not to approach too near the shallow spit at the eastern end of Urmek island in hauling to the north-westward; and, if bound for the anchorage in the entrance, keeping well to the north-westward to avoid the shore-reefs until the marks, already given for entering, are on.

Kadaman Seghir island.—From the south-western point of Urmek island, Kadaman Seghir is distant 6 miles in a W. by S. $\frac{1}{2}$ S. direction. It is small, low, sandy, and surrounded by a reef.

Kadaman Kebir island is $4\frac{1}{2}$ miles S.W. $\frac{1}{2}$ S. from the nearest part of Urmek island. From its western end, a reef extends W.S.W. nearly $1\frac{1}{2}$ miles, and has 5 fathoms water at its extreme. There is a 3-fathoms patch about West 2 miles from Kadaman Kebir.

A reef, upon which the S.S. *Chatham*, drawing 12 feet of water, struck in April 1899, lies about 2 miles eastward of Kadaman Kebir island in the northern approach to Kamaran bay.

Shab Badinjan.—About $4\frac{1}{2}$ and $5\frac{1}{2}$ miles S.S.E. from Urmek island, and 2 and 3 miles off Ras Haram, are the two small shoals which together form Shab Badinjan. At 10 miles S.S.E. $\frac{1}{2}$ E. from Urmek is another small shoal 3 miles from the shore. These shoals may all be seen by a good look-out and passed on either side, though it is as well to pass westward of them in going from Kamaran bay through the Inner channel to Loheiya or the contrary.

KAMARAN ISLAND.—The northern point of this island, (~~now~~ ~~British possession~~) is nearly 10 miles South of the mosque on the

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south-western side of Urmek island; from thence it extends in a S. by W. direction 12 miles, and is at the northern end less than 2 miles wide, but for the greater part about 4 miles in width. The island is composed of hard rock intermixed with sand, and, in some parts, earth capable of cultivation; there are some spots on which date trees flourish. The island is generally low and sandy in appearance, rising a little towards the southern end, where there are a few hillocks; on the northern side there is swamp and low scrub. Wood and water may be obtained on the island, and also fish by means of a seine.

In addition to the town of Kamaran there are five small villages on the island; the total population is about 2,000. The town of Kamaran is largely increasing; there are several large brick and stone buildings, including condensing and ice-making works, British consul's house, &c. The inhabitants are mostly fishermen, and are also employed in pearl fishing. Mails are sent and received from Hodeida weekly. The officials of the island are the Mudir, captain of the port, and the medical inspector and staff of the lazarette. At Salif, on the opposite side near Jebel Mahasin, are large rock-salt works, the amount exported in 1898 representing a profit of about 10,000*l*.

Except a small portion of its eastern side, the island is bordered by a reef, which is about half a mile wide at 2 miles to the northward of the south-east point. A shoal plateau, however, extends from this south-east point towards Ras el Bayadh for nearly three-quarters of a mile, with $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms on it; the bottom is hard sand and weed. The reef off Ras el Bayadh is comparatively steep-to. The distance between the 5-fathoms depths in the entrance is narrowed to about 2 cables, these contour lines being about 6 cables from the island side, and about $1\frac{1}{2}$ cables (in the narrowest part) from Ras el Bayadh.

The telegraph huts at the entrance occasionally show up well for 2 or 3 miles in a good light, but otherwise the entrance to the passage is hard for a stranger to make, the small white beacon on Rishah island being almost useless as a landmark.

The tides are strong in the entrance, but set almost straight through. The discolouration of the water at this part is very remarkable, especially to the north-east of Ras el Bayadh when the tide is setting in strong, as there is a perfectly marked line of light and dark water extending northward for sometimes nearly a mile, the light part being right across the channel, and the dark part in Dicno bay. This discolouration is not confined to the entrance, but extends to Rishah island, Arab shoal, and well off Ras Hamara; the colour gives no indication of the depth, dark-coloured water being found at times on the $2\frac{1}{2}$ -fathoms patch on Arab shoal, and very light-coloured water in 20 fathoms.

See Kamaran bay, plan No. 14.

Supplies.—At the town of Kamaran, beef and mutton can be obtained in small quantities; vegetables are difficult to procure, as they mostly come from Hodeida. During the pilgrim season there is always a good supply of condensed water, and ice, for the use of the pilgrims, the water being conveyed to the lazarette by pipes. It is not advisable to use water from the wells for drinking purposes. Coal cannot be got except by freight steamer from Aden or Perim, which is easily ordered by telegraph.

Telegraphic communication.—The quarantine station at Kamaran bay is connected by a submarine cable and land line with Hodeida, and thus with all parts of the world where lines are laid. The submarine cable crosses from Yemmen on the south point of Kamaran island to Ras el Bayadh; vessels should not anchor on this line.

Beacon.—A square masonry beacon, surmounted with pole and globe, stands at the extreme south-east point of Kamaran island close to the telegraph huts, on the north side of the south entrance to Kamaran bay.

Anchorage.—There is very good anchorage for small vessels in Kamaran harbour in 7 fathoms, mud, with the ruined fort bearing S.W. about 2 cables. The entrance to this harbour is narrow and difficult; it is, however, well buoyed in the pilgrim season, but afterwards the buoys are removed, and the whole place practically deserted except by fishermen. Vessels anchoring in the Quarantine ground, must be careful of the point of reef which runs out about 6 cables from the shore, $1\frac{1}{8}$ miles to the northward of the harbour.

A patch of one fathom is said to exist 5 cables S.E. by E. from the point of the above-mentioned reef, and one of $3\frac{1}{2}$ fathoms at about 7 cables S. $\frac{1}{4}$ W. from it.

There are two piers in the bay next northward of Kamaran harbour, which afford good landing places for boats.

There is another anchorage off the western side of Kamaran island in 4 fathoms, opposite Makram village, known by a few date trees and a small white mosque southward of it. The reef extends a mile off this part, with a small sandy shoal, at times above water, one mile N.W. of the village.

About 3 miles N.W. of Makram is a small sandy island with a reef extending half a mile from its western side, and for a less distance off its eastern end; there is a channel on each side of it.

Quarantine.—Pilgrim vessels from India or other parts beyond the Red sea, if carrying more than 5 pilgrims per 100 tons, have to call at Kamaran and perform a quarantine before proceeding to Jidda. In case of cholera breaking out in Hedjaz, all ships for Yemen, Basra, &c., are required to perform quarantine at this place and to get free pratique before

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Winds and weather.—Southerly winds are almost continuous from October to March, at times blowing very hard, and during these months rain falls five or six times; the whole of this period the climate is very unhealthy, with the wet and dry bulb thermometer standing about the same height. Northerly winds blow from April to September, very hot and dry.

KAMARAN BAY.—From Loheiya southward the shore is bordered by a reef which in some places stretches off upwards of 3 miles. Abreast of the northern end of Kamaran island, where the remarkably fine bay of that name commences, the Inner channel is 5 miles wide. Abreast of Ras Harifi, it is about 4 miles wide; this Ras is the northern extreme of Jebel Mahasin, a high piece of land jutting out into the middle of the bay from the southern shore, and dividing it in two. Jebel Mahasin, 190 feet in height with two small round peaks, may be easily recognised on a fairly clear day as being the highest ground near the coast on the mainland. The mosque and village of Salif are rarely seen until a vessel is inside the entrance. The inner half of the deep bay eastward of Ras Harifi, is occupied by shoals; in its outer half, however, anchorage may be had in from 7 to 4 fathoms, and here firewood may be obtained.

Ras el Bayadh.—From the western point of Jebel Mahasin, Ras el Bayadh bears S.W. 5 miles, the coast between, which is flat and sandy, forming a deep bay to the south-eastward, and then trending about W. by N., and terminating in Ras el Bayadh, the southern point of entrance to Kamaran bay. The Ras is low and sandy, and with a few trees about a mile inland; it is surrounded by a reef. A pole beacon, surmounted by a cage, marks the north-west extreme of Ras el Bayadh.

For the continuation of the coast line to the southward from Ras el Bayadh, see page 334.

Depths.—In the northern part of Kamaran passage, the general depths are from 8 to 12 fathoms, mud; in the southern part from 18 to 30 fathoms. From the edge of the island reef a perfectly gradual slope from $2\frac{1}{2}$ to 5 fathoms (with one small patch of $2\frac{1}{2}$ fathoms near outer edge) extends some distance out in the southern entrance; the bottom is hard sand. Off Ras al Bayadh the reef is comparatively steep-to. The best water in the southern entrance is from 6 to 12 fathoms, the greatest depth being towards Ras el Bayadh.

See Kamaran bay, plan No. 14.

Tides.—It is high water, full and change, at Kamaran harbour at 1h. 4m.; springs rise $3\frac{1}{4}$ feet, neaps 2 feet. Springs occur from 3 to 5 days after full or new moon, but the rise and fall is greatly influenced by the winds, the tide sometimes standing still for several hours during strong south winds.

Buoys.—Buoys are sometimes moored at the southern entrance to Kamaran bay, red on the starboard hand in entering, and black on the port hand. These small buoys are intended to mark the edges of the reefs on either side, but are not to be relied on, as they are often out of position, and frequently break adrift. They are more likely to be in place during the pilgrim season.

Directions for the South Entrance.—The position of Kamaran bay makes it a convenient anchorage for vessels obliged to seek shelter through stress of weather. It is often used by steam vessels proceeding southward through the central channel during the winter season; and, as the strong southerly breezes which then prevail frequently bring hazy weather, care is required in making for the bay, as Kamaran island is low and the currents are strong and uncertain.

In approaching this entrance from the southward, pass inside Rishab, a little island or sand-bank $3\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. from the point southward of Ras el Bayadh and on which island a stone beacon about 25 feet high, and painted white has been erected, which can be seen in clear weather at the distance of from one to 5 miles, according to the day being bright or dull. Keep in about 14 or 15 fathoms along by the coast reef, and having made the sandy point of Bayadh, haul round it as requisite for the entrance, passing between the red and black buoys if they are in place, but bearing in mind the cautions previously given as to the probability of the buoys being out of position. The southern summit of the high land of Jebel Mahasin, N.E. by E. $\frac{1}{4}$ E., leads through the channel in not less than 8 fathoms.

Caution.—Care should be taken in entering this channel as when there is any wind the outer edge of the plateau off the island reef is not easily seen; the passage is said to be only 2 cables in width. The afternoon is the best time, as a vessel will then have the sun high or astern of her. The tides outside the entrance run very strong.

Anchorage.—Good anchorage may be found all over Kamaran bay, the best one in strong southerly winds being in Dicno bay, close under the land in 17 to 20 fathoms, where the water will be found perfectly smooth. There are four mooring buoys off the pier end at Salif, for the use of steamers going alongside the pier to take in cargoes of salt.

Shoals.—At 4 miles westward of Makram is a dangerous shoal 4 miles long in a N.N.W. and S.S.E. direction, with a depth of 2 fathoms one mile

See Kamaran bay, plan No. 14.

from its north-western end, and 4 to 9 fathoms on other parts, rocks and sand. There are 32 fathoms at its northern end, and from 20 to 18 fathoms just within it.

At 9 miles westward of Makram village is another bank of rocks and sand, with 4 fathoms on its shoalest part near the southern end, and from 7 to 9 fathoms elsewhere; it is nearly 3 miles long, north and south, and has from 20 to 30 fathoms near it on all sides. The discoloured water on both these shoals may generally be seen.

Arab shoal, of sand and coral, lies in the approach to the southern entrance of Kamaran bay, N.N.W. $\frac{3}{8}$ W., distant $4\frac{1}{8}$ miles from Rishah island beacon, and with Yemmen cable beacon bearing N.E. by E. $\frac{1}{2}$ E. The least depth on the shoal is $2\frac{1}{2}$ fathoms, but depths of 4 fathoms, part of the same shoal, extend half a mile in the direction of Rishah island. The channel outside the 5-fathoms line, between this shoal and Rishah island, is about $2\frac{1}{3}$ miles wide; the 5-fathoms line extending about one mile from Rishah, and three-quarters of a mile from the $2\frac{1}{2}$ -fathoms patch, in the direction of Rishah. Between Arab shoal and Kamaran island the channel is deep, and about $2\frac{1}{8}$ miles wide. This latter channel is much to be preferred for vessels coming from the North, as the fringing reef of Kamaran island is easily seen, and is moderately steep-to; while it is extremely difficult to see Rishah beacon at a sufficient distance to use a bearing of it for clearing the Arab shoal. Caution is necessary in this vicinity, as the tides run very strong.

South El Bodhi, about 3 miles north-westward of Kamaran, is a low sandy island about 3 miles in length, east and west, which is surrounded by a reef that extends $1\frac{1}{2}$ miles off the southern side, with 5 or 6 fathoms, rocks and sand, on its edge. At $1\frac{1}{4}$ miles N.E. of its eastern end is a one-fathom patch.

There is a good channel on either side of El Bodhi; that between it and Kamaran is $2\frac{1}{2}$ miles wide, with from 10 to 23 fathoms, and is bounded on its southern side by Kamaran and the small island before described lying north-westward of Makram; and, on its northern side, by the reef off the southern side of El Bodhi.

OKBAN ISLAND.—About West $4\frac{1}{2}$ miles from El Bodhi is the south-eastern end of Okban island, which extends from thence in a north-westerly direction about 5 miles. It is low and sandy in the centre with a hill on its north-western end, and a bluff on the south. There is deep water on its eastern side, but the shore reef extends nearly a mile from the south end of the island, and runs along the western side about half a mile off the shore; it then continues round the northern end, where it extends 2 miles off and is steep-to, having 23 fathoms near its western edge, and 8 and 15 fathoms on the edge of the reef at the northern end,

See plan, No. 14, and chart, No. 143.

decreasing towards the island. A bank or reef of 7 fathoms lies about $3\frac{1}{2}$ miles N.E. $\frac{3}{8}$ E. from the peak of Okban, with Kotama peak bearing N.W. $\frac{5}{8}$ N.

OUTER CHANNELS.—There is a good channel passing southward of Okban and El Bodhi into Kamaran bay, and there is also a channel between Okban and El Bodhi for vessels bound to Loheiya. Any of these channels may be used by keeping a look-out for the patches, which may be seen except in hazy thick weather.

There is a good channel between Kamaran island and the inner shoal westward of it, where the width is about 2 miles between the shoals; and $1\frac{1}{4}$ miles between Kamaran reef and the small island 3 miles N.W. of Makram village. The bluff on the southern side of Okban island, bearing about N. by W., will lead between the inner and outer shoals westward of Kamaran island.

DIRECTIONS.—Having passed about 3 miles westward of Rishali island, in 24 fathoms, steer about N. by W., passing westward of the Arab shoal, and from thence steering not less than one mile outside the western extreme of Kamaran island, but giving rather a wider berth to the island reef south-westward and westward of Makram village, the outer part of which reef bears nearly South of the eastern extreme of the small island 3 miles N.W. of that village. Having cleared the western extreme of this reef, steer to the north-eastward between the small island and Kamaran reef, where there are from 5 to 7 fathoms in mid-channel. Having passed the small island, the depth increases to 16 and 17 fathoms in mid-channel between El Bodhi and Kamaran island; then, if going round the northern end of Kamaran, stand no nearer than into 14 fathoms water, as 10 fathoms are near the edge of the reef which extends about a mile from it. But, if going to Loheiya, beware of the one-fathom patch about $1\frac{1}{4}$ miles northward of the eastern end of El Bodhi and steer direct for the narrow channel at the eastern end of Urmek island, leaving the two small shoals which together form Shab Badinjan on the starboard hand, and a patch with less than 12 feet lying about 2 miles eastward of Kadaman Kebir, on the port hand.

FARISAN BANK.—This extensive shoal and rocky bank, the northern point of which is in lat. $20^{\circ} 4' N.$, and lies 12 miles westward of Lith, continues as far South as Kamaran island, the inner edge of the bank forming the western side of the Inner channel on the Arabian side, which channel has been described in the preceding pages of this chapter. The Farisan bank, including Kamaran island within its limits, is about 320 miles long in a general S.S.E. direction, and from its northern extreme to the parallel of $18^{\circ} N.$ is full of dangerous patches, so that no ship should attempt to cross it.

Captain Elwon remarks—"In prosecuting the survey, we have been in the *Benares*, from the nature of the duty, amongst all these islands, reefs, and banks, where the depth of water permitted, excepting that part of the Farisan bank to the south-west of Abulat island, and also immediately above and below Sabaya and Kutna islands, which was found too dangerous. I think few navigators will frequent the channels amongst the islands and reefs on the broadest parts of the banks to the north of 17° of latitude, on account of the deep water and great distance of either coast; which render it probable that they would not be able to procure anchorage before nightfall, and therefore would be obliged to heave-to amongst the reefs and islands for the night.

"The country boats make fast to the islands and reefs, either by means of a boat or by a man swimming with the end of a hawser and a hook from the vessel to the reef, and hooking on to the rocks.

"Should it ever become necessary to pass from the central to the inner channels on either side the Red sea, it will be requisite to make certain of the vessel's situation, so as to be at a moderate distance from the reefs at daylight, in order to have as much of the day as possible to run across with; and a sharp look-out must be kept for the sunken patches, some of which can only be seen in clear weather, and when the sun is in the opposite direction to the ship's course."

Channels.—There is no safe passage across that part of the Farisan bank called the Shab Farisan, which is a succession of reefs on the outer side of the bank, 53 miles long in a S.E. by S. direction, commencing from about lat. $17^{\circ} 3' N.$, and terminating with Marrak island in the south-east. Southward of the Farisan islands there are many channels across the bank, which, however, from their nature, require the utmost care in navigating.

The reefs, shoals, and islands of the Farisan bank at the northern and southern ends, as well as those along its whole length on the eastern side where they form the western boundary of the Inner channel along the Arabian shore, will be found fully described between pages 289-313. We now return to the northern end of the bank and proceed to describe in regular order, from North to South, those bordering upon the western side of this immense bank, and which consequently concern the safe navigation of the central track through the Red sea.

ABULAT ISLAND.—This island, the northernmost on the Farisan bank, with the shoal patches N.W. and N.E. of it, is described at page 289.

Shab Suleim.—About $4\frac{1}{2}$ miles West from the north-western point of Abulat island is the northern end of Shab Suleim, a breaking reef $3\frac{1}{2}$ miles long N. by E. and S. by W. and one mile wide.

See charts, Nos. 8c and 8d.

Shab Jenab is a reef lying $10\frac{1}{2}$ miles W. by S. from the northern end of Abulat island and about 2 miles within the western edge of the Farisan bank.

Shab Sahabak is a breaking reef between Shab Jenab and Shab Suleim, a little southward of an imaginary line joining them. There is deep water close to the three last-mentioned shoals.*

Dohra, Marma, El Jedir, and Matathu islands.—Dohra is 14 miles S.W. by W. $\frac{1}{2}$ W. from the southern end of Abulat island; Marma is $1\frac{1}{2}$ miles E. by N. from Dohra; El Jedir is $1\frac{3}{4}$ miles S. $\frac{1}{2}$ W. from Marma; Matathu is $2\frac{1}{2}$ miles S. by W. from Dohra. All these islands are of sand and coral, very low, and with deep water close to. On Matathu, in 1834, there were the remains of a fisherman's hut and a considerable number of graves.

There is a small breaking patch half a mile north-westward of Matathu and another $3\frac{1}{2}$ miles from El Jedir; the latter shoal is called Shab As-sabb in the original directions by Captain Elwon, but as no bearings are given it has not found a place on the chart.

Danak island, in lat. $19^{\circ} 31\frac{1}{2}'$ N., long. $40^{\circ} 2\frac{1}{2}'$ E. and $15\frac{1}{2}$ miles S. by E. $\frac{1}{8}$ E. from Matathu, is a low coral island surrounded by a reef, with no bottom close to at 130 fathoms. N. $\frac{3}{4}$ E. 5 miles from it is Shab Shair, and N.W. one mile from the latter is Shab As-saba, north-eastward of which and $1\frac{1}{2}$ miles distant is another shoal; and, N.E. $\frac{3}{4}$ N. 5 miles from Danak is Shab el Girb.

About $1\frac{1}{2}$ miles S.E. from Danak is a shoal patch; at the same distance N.E. is a breaking patch; and N. by W. 3 miles is Shab Amar, a half-moon reef with 6 and 8 fathoms off its eastern verge. Within or eastward of this cluster, the bank appears from the masthead to be full of shoals.

Shab el Jebbara lies 4 miles S.E. by E. $\frac{1}{2}$ E. from Danak island. Between Shab el Jebbara and Danak, at $1\frac{1}{2}$ miles from the latter, is the small rocky shoal bearing S.E. from Danak, described above.

Jebbara is a low sand and coral island, surrounded by a reef, with no soundings at 105 fathoms close to. It lies 4 miles S. $\frac{1}{2}$ E. from Danak island.

About 2 miles north-westward of Jebbara is Shab el Mudharr; and about the same distance north-eastward of it is Shab el Mahdhun, with a small sandbank on it.

Shab Assaka is a low rocky coral island on a reef about 4 miles S. by E. $\frac{1}{2}$ E. from Jebbara island, having no bottom at 105 fathoms close to it, but a depth of 17 fathoms at the distance of 9 miles in a W. by S. $\frac{1}{2}$ S. direction, near the outer edge of the reefs.

* In 1877, Commander Wharton, H.M.S. *Fawn*, considered the positions of these shoals doubtful; see Caution, page 285.

See chart, No. 8c.

Shab Dauka, 7 miles S. by E. $\frac{1}{4}$ E. from Shab Assaka, is a breaking coral reef about 4 miles long N.N.W. and S.S.E. About 3 miles S.W. from the centre of Dauka reef, there is a small one-fathom shoal with no soundings at 145 fathoms close to.

Shab Mubarak, in lat. $19^{\circ} 0'$ N. and $11\frac{1}{2}$ miles S. by W. from the southern part of Dauka reef, is a breaking shoal at the outer part of the reefs in this neighbourhood.

Murabit el Khail shoals.—Ring reef.—East 8 miles from Shab Mubarak is a breaking patch, the commencement of these shoals, and E.N.E. $1\frac{1}{2}$ miles from it there is a narrow breaking reef about $3\frac{1}{2}$ miles long E.S.E. and W.N.W. About 13 miles E. by S. from Shab Mubarak is Ring reef, composed of coral, about 2 miles across, with water breaking all round the edges and apparently deep water inside.

SHAKER ISLAND, in lat. $18^{\circ} 52'$ N., long. $40^{\circ} 25'$ E., bears S.S.E. $\frac{3}{8}$ E. 35 miles from Shab Assaka; it is a small low sandy island on a coral reef, with some bushes on it, and there are no soundings at 120 fathoms close to its northern point. About 5 cables westward of it is the northern end of Shab Maras, a breaking shoal, which from thence extends S.S.W. $2\frac{1}{2}$ miles; there is no bottom at 70 fathoms between them.

Tedkar island, E. by N. $\frac{3}{4}$ N. 12 miles from Shaker island, is a small low island with some bushes on it, and a long reef off its southern end; there is no bottom at 50 fathoms between it and Muska island. There is a breaking reef N.W. $\frac{1}{4}$ N. 9 miles from Tedkar, another N. by E. $\frac{3}{4}$ E. 4 miles from it, and a third 2 miles N.E. by E. from it.

Doshakiya is a small low island E. by S. $\frac{1}{2}$ S. 6 miles nearly from Tedkar.

Muska, 5 miles southward of Tedkar, is a small low island on a coral reef; there are no soundings at 50 fathoms close to it.

SHARBEIN, in lat. $18^{\circ} 44'$ N., and 8 miles southward of Muska, is a small low sand and coral island, with some bushes on it. In 1834, there were on it the remains of a fisherman's hut built of stones.

No channel.—From the northern end of the Farisan bank to Sharbein, the bank is full of dangerous patches with deep water between, but no navigable channel.

Abu Sayal reef.—At 5 miles E. by S. from Sharbein island is the northern end of Abu Sayal, a narrow perpendicular reef of breakers about 5 miles long north and south. Eastward of Abu Sayal, about 6 or 7 miles distant, are other dangerous reefs.

Abu Kulur is a narrow breaking reef about 3 miles long north-west and south-east, lying S. by W. 2 miles from Sharbein.

Abu Dahra island bears S.E. $13\frac{1}{2}$ miles from Sharbein, and E. by S. $\frac{1}{2}$ S. $4\frac{1}{2}$ miles from the former is Jebara island. Both Abu Dahra and Jebara are small and surrounded with shoals and rocky dangers which preclude the possibility of a passage.

Dorish is a low sandy island covered with bushes, situated on a coral reef W.S.W. 9 miles from Abu Dahra.

The islands **Jebel Sabaya** and **Jezirat Kutna**, eastward of Dorish, have already been described in connection with the Inner channel, at page 295.

El Umm, Sabiya, and Maghabiya are three small low islands of coral and sand, having no soundings at 45 and 80 fathoms in their vicinity. They are from 14 to 16 miles S. by E. from Dorish, and near the western edge of the bank at this part. North-eastward of these islands, a low sand-bank and two reefs were seen from the mast-head by the surveyors, and beyond them nothing but shoals.

El Hala is a sand-bank S.S.W. about $1\frac{1}{2}$ miles from Maghabiya island.

Mafsubber is a small island surrounded by reef, E.S.E. 7 miles from Sabiya; there is a small reef at $2\frac{1}{2}$ miles W.S.W. from Mafsubber island.

Shab Ali is a long breaking reef S.E. 11 miles from Sabiya island, and there is another breaking patch W. by N. 5 miles from it. N.N.E. $2\frac{1}{2}$ miles from the latter is a reef; and N.E. 2 miles from the former is another reef, with 14 fathoms close to the northward, and no bottom with 35 fathoms eastward of it.

Dahret Meraya.—About 6 miles in a south-easterly direction from the southern end of Shab Ali are these two small sandy islands. The eastern one is surrounded by a reef and there is a rocky patch between them. There are also patches of rocks southward of both, and 4 miles S.W. from the westernmost is a shoal of sharp pointed rocks with deep water between them, and no bottom at 50 fathoms close to their western side. E. by N. $\frac{1}{2}$ N. 6 miles from the eastern Dahret Meraya, and S.W. by W. 13 miles from Jezirat Marka, is a rocky shoal about 3 miles long in the latter direction, with from 5 to 14 fathoms on its western end; and N.W. and S.E. from it, $2\frac{1}{2}$ miles in each direction, are rocky patches with 28 fathoms between, and no bottom at 50 fathoms northward of the north-westernmost.

Zukak and Dahret Abu Masali islands.—From the western Dahret Meraya to Zukak is W. by N. $\frac{1}{4}$ N. 9 miles, and S.E. 3 miles from Zukak is Dahret Abu Masali. The latter is a very small sand-bank

See chart, No. 8d.

or island—the former is something larger, and either a sand-bank or a small sandy island; they are both low and have not a bush on them.”

Shab Maras.—Between the last-named two islands is the northern part of Shab Maras, on which the sea breaks; from thence it extends 8 or 9 miles to the southward and is from 5 to 8 cables wide; there are some parts where it may be crossed, but the southern end breaks and has 15 fathoms close to its eastern side; farther northward there is no bottom at 50 fathoms.

Rocky shoals.—Between W. by N. and S.W. by W. of the breakers on the southern end of Shab Maras, distant 5, $6\frac{1}{2}$, and 8 miles are five rocky patches, and at 9 miles on the latter bearing is a 5-fathoms patch. There is also a patch S. by W. 5 miles from the same breakers.

Shab Rabid.—From 8 cables to $1\frac{1}{2}$ miles N.E. from the northern point of Shab Maras, are two small breaking patches, called Shab Rabid; the southernmost has 109 fathoms alongside of it.

Between the north-western point of Shab Maras and Zukak island is a one-fathom patch, and W.N.W. of Zukak from one to $1\frac{1}{2}$ miles, is another one-fathom patch; there is also a rocky patch $1\frac{1}{2}$ miles N. by W. $\frac{1}{2}$ W. from Zukak; on the western part, close to Zukak, there are 115 fathoms. S.W. by W. 3 and 5 miles from Zukak are two patches of rocks, and S.W. $\frac{1}{2}$ S. 4 miles from it is another.

Dahret Simer, its centre in lat. $17^{\circ} 51' N.$, long. $41^{\circ} 8' E.$, and its eastern end bearing W. by N. $\frac{1}{8}$ N. $13\frac{1}{2}$ miles from the western end of Simer island, described at page 299, is an island surrounded by a reef with 7 fathoms close to the northward of it. S.W. $2\frac{1}{2}$ miles from it is a rocky shoal 2 miles long, with one fathom water, and 20 fathoms close to its northern end; and W. by N. $1\frac{1}{2}$ miles from it is a similar one-fathom shoal. W.S.W. 9 miles from Dahret Simer is a rocky shoal; also, at $1\frac{1}{2}$ miles northward of the island, and N. by E. 4 miles from it are shoals, having a channel between the two with from 18 to 25 fathoms.

At 10 miles N.E. $\frac{1}{2}$ N. from Dahret Simer is a rocky shoal with 6 fathoms on its southern end; and N.W. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles from the island is a large rocky shoal, which has 2 fathoms on it and no bottom at 105 fathoms close to its eastern side; N. by E. about 2 miles from it is another shoal about 2 miles long N.N.W. and S.S.E.; between these there is a depth of 43 fathoms, and W. by N. $1\frac{1}{2}$ miles from the latter is a rocky patch, with 26 fathoms between them. W. by N. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles farther, is a cluster of rocks with 115 and 118 fathoms between them and the next cluster of reefs to the westward, and with 30 fathoms on their eastern side.

WASALIYAT ISLANDS.—S.W. by W. $\frac{1}{4}$ W. 15 miles from Dahret Simer is the northern Wasaliyat island, in lat. $17^{\circ} 42' N.$,

long. $40^{\circ} 55'$ E.; the other island lies South one mile from it, the two islands occupying a space of $2\frac{1}{2}$ miles; both are low and sandy, and there are the remains of an old hut on one of them; they are on a sand and coral bank 4 miles in length and nearly 2 miles in width. These are the first islands met with near the outer edge of the reef northward of Shab Farisan.

Shab el Juma.—S.W. $5\frac{1}{2}$ miles from South Wasaliyat island is the rocky patch Shab el Juma, and S. by E. 3 miles from the island is a 2-fathoms patch with 28 fathoms between. Shab el Juma is within 5 miles of the edge of the bank.

Rocky patches.—West 5 miles from North Wasaliyat island is a dangerous rocky patch. Between the bearings S. by E. and S.E. by S. from South Wasaliyat, and from 14 to 20 miles distant, is a cluster of rocky patches, and some shoal patches with 2 and 3 fathoms water on them. Eastward and south-eastward of these, there are numerous shoal patches, whose positions will be better understood by reference to the chart than by a written description.

Matrahein island.—In lat. $17^{\circ} 9'$ N., long. $41^{\circ} 34'$ E., is the small rocky island Matrahein, one of the out-lying islets of the group of which the Farisan islands form the centre. Eastward of it, and N. by E. 7 and 8 miles from Jebel Momed, which lies south-eastward of Matrahein, are four shallow rocky patches with 11 and 18 fathoms near them. Between these patches and Matrahein is a bank of irregular soundings $3\frac{1}{2}$ miles wide stretching 3 or 4 miles northward, with a least depth of 2 fathoms upon it, and 35 and 40 fathoms near its edges.

Dahret Matrahein, S.W. by S. 7 miles from Matrahein, is a small rocky island with a reef round it; and, $2\frac{1}{2}$ miles northward of it, is a rocky bank of from 20 to 25 fathoms, and no bottom at 40 and 60 fathoms near it.

SHAB FARISAN, on the western side of the Farisan bank and fronting the Farisan group of islands, is an extensive shoal and rocky bank about 53 miles long in a S.E. by S. direction, including Marrak island and the shoal on which it stands as its south-eastern extreme, and it has a general width of 10 miles; its northern end is in lat. $17^{\circ} 3'$ N. There are numerous islands and many dangerous patches on this Shab; those near the north-western end are presently described, but the others will be more conveniently referred to in the general description of Farisan and its adjacent islands and shoals in the following pages. There is no safe channel across the Shab Farisan, but there is a deep water channel between it and the islands, varying in width from $1\frac{1}{2}$ to 5 miles, which may be entered at either end of the Shab.

Seil Makawar, S.W. by W. $\frac{3}{4}$ W. 10 miles from Dahret Matrahein, is surrounded by a shallow bank and has several rocks north-eastward of it. It is the northernmost island on the Shab Farisan, and is about 4 miles from either edge of the bank, and 6 or 7 miles from its north-western extreme; between it and the extreme are many dangerous rocky patches.

Dhi Dhahaya and Hanish islands, also on the Shab Farisan, are close together about 5 miles S.E. by S. from Seil Makawar, and are both low and sandy.

Khaima island, E.S.E. 5 miles from Dahret Matrahein, is a low triangular island of sand and coral one mile wide, surrounded by five small islands, two of the smallest of which are off its northern end; on the West is a larger one; one is on the South-west, and another on the South-east. They are all surrounded by a coral reef which is connected with the bank running westward from the northern end of Farisan Seghir. Five miles S.W. by W. $\frac{1}{4}$ W. from Khaima island there is a bank about 2 miles in length, east and west, upon which the depths are from 3 to 6 fathoms.

Jebel Momed island, S.E. 9 miles from Dahret Matrahein, is 2 miles long and one mile wide; on the eastern part is the high wedge-shaped hill called **Jebel Momed**; the other parts are low ground of sand and coral. The island is nearly surrounded by a gut of deep water of from 15 to 25 fathoms, mud. A bank runs off north-westward from its northern side with from 3 to 4 fathoms water; and, North $2\frac{1}{2}$ miles from the eastern part of the island, there is a patch of 2 fathoms.

JEZIRAT DISAN.—S.S.E. about 3 miles from Khaima is the northern point of Jezirat Disan, whose western edge extends $4\frac{1}{2}$ miles southward; it is of triangular form, about 13 miles in circumference, and is generally flat near the sea, rising gradually towards the centre, but having at its southern part a high and remarkable hill. The south-eastern part of Jezirat Disan is connected by a shallow bank with Ras Farisan, the north-western point of Farisan Kebir, and there are three rocky islands between them, two small ones near Ras Farisan and a larger one on the south-eastern side of Disan, with a small boat channel westward of it. The banks off the eastern side have some dangerous rocks, but the other sides have deep water. A small island lies off its northern end, with deep water between them.

On the southern side of Jezirat Disan are the remains of a village consisting of about a hundred houses built of rough stones without cement; and, near it, a cemetery containing about a thousand Mussulman graves, and a tomb enclosed by a wall. This place is said to have been inhabited

in about the year 1833. Neither wood nor water was found by the surveyors.

Jebel Disan is a high hummock on the southern part of the island of that name.

SARSO ISLAND.—S.W. by S. 8 miles from Khaima is the northern end of Sarso island, which extends from thence about $5\frac{1}{2}$ miles in a south-easterly direction; and eastward of and parallel with it, is another island called Sindi Sarso; they are two narrow coral islands about half and a quarter of a mile wide respectively, and both are of considerable height, Sarso being 160 feet above the level of the sea, with sharp points of coral showing above its surface. They are on the eastern verge of the Shab Farisan, which extends about 9 miles westward from them, and 17 or 18 miles to the north-westward.

The channel between the Sarso islands has from 14 to 20 fathoms in the middle, but is narrow and blocked up at the south-eastern end by small islands and shoal water. It affords good protection from southerly winds, but it is not advisable for a sailing vessel to anchor in it with northerly winds, as there would be some difficulty in getting out.

Button rock is a small rocky patch of 3 fathoms close to the western side of Sarso, about a mile from its north-western point.

There are three small sandy islets south-westward of Sarso, one distant 3 miles, the other two 6 miles. The water is very shoal in their neighbourhood.

THE FARISAN ISLANDS are the largest islands anywhere along the eastern side of the Red sea; they lie westward of Ras Turfa and of Gizan on the mainland, and from them is named the vast bank extending a distance of about 320 miles parallel with the eastern coast and dividing the central track through the Red sea from the narrow Inner channel on its eastern side. These islands are between one quarter and one third of this distance from the south-eastern end of the bank. They are two in number, but for all practical purposes form but one island, being connected by a sandy spit so shallow that camels frequently pass from one island to the other. On the eastern side of this spit is Khor Hasayif opening to the north-eastward; and, on the western side, Khor Bakara opening to the north-westward. They are of very irregular shape and will be better understood by consulting the chart than by any written description.

The south-western island is Farisan Kebir, 31 miles in length N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E., and lying between the parallels $16^{\circ} 54\frac{1}{2}'$ N. and $16^{\circ} 36'$ N. Farisan Seghir is on the north-eastern side of Farisan Kebir; it is 18 miles in length, and, lying in a bight of the other island, extends at Ras Rasib, its northern extreme, to lat. $17^{\circ} 1\frac{1}{2}'$ N. Although their whole breadth is

See chart, No. 8d.

only 12 miles, from the irregularity of their form they measure 130 miles round their edges. The south-eastern point of Farisan Kebir bears S.W. $\frac{7}{8}$ W. 26 miles from Gizan.

The land of Farisan is of considerable leight, interspersed with some plains and valleys. The hills are of coral rock, the most remarkable being Jebel Kasr, a small round hill eastward of Tibta bay. Jebel Safah is a high part of the island to the northward, with a tree on its summit; it lies south-westward of Seil Abadho. Remarkable bluff is of wedge shape on some bearings, and, from the southward, appears like a hummock with a peak in the centre; it is on the western part of the southern end of Farisan Kebir, and on the eastern side of the eastern entrance to Khor Kumb and Tibta bay. There are also three remarkable trees 2 miles southward of Jebel Kasr. The north-western part of Farisan Kebir is high and rocky.

KHOR BAKARA.—East 5 miles from Ras Farisan is the north-western extreme of Farisan Seghir, where is the small village of Keftib on the highest part of the land. Between these points is the entrance of Khor Bakara, the inlet between the two Farisan islands which runs in about 16 miles to the south-eastward. The outer entrance to this Khor is between Khaima island and Jezirat Disan.

Depths.—There are irregular depths of from 4 to 8 fathoms in the inner part of the khor; the outer part has deep water, but in the narrowest part, about 5 miles within the entrance, there appears to be as little as 3 fathoms. It is not advisable for sailing vessels to run far up the Khor, as some parts are so narrow that they would have to warp a considerable way out against a north-westerly wind.

Anchorage.—Shoal.—The bank which connects Jezirat Disan with Ras Farisan extends 4 or 5 miles within, and on both sides of the Ras; on the edge of this, a ship may anchor in from 16 to 18 or 20 fathoms, $1\frac{1}{2}$ or 2 miles eastward of the Ras, but, at $2\frac{1}{2}$ miles eastward of Ras Farisan, and on the edge of the bank, is a small 3-foot patch, of which vessels seeking an anchorage or entering the khor must beware.

About $1\frac{1}{2}$ miles south-eastward of the Ras is the village of Sayal. Just within the narrowest part of the khor on the western side, and close to the beach, are two or three wells of good water.

Triangle island.—S.W. 3 miles from Ras Rasib, and S.S.E. 4 miles from Jebel Momed, is a triangular island 5 or 6 miles in circumference, standing on the southern edge of the bank which extends westward from Ras Rasib to Khaima island, and having 16 fathoms on its southern side; about midway between Triangle island and Jebel Momed, is an island about a mile in length with three smaller ones in line due West from it, all low coral islands. On the southern edge of this bank, and 4 miles westward of Triangle island, is a one-fathom patch; this patch is about $2\frac{1}{2}$ miles

from the north-eastern side of Jezirat Disan, and there is deep water close southward of it.

JEZIRAT AKBEIN.—A bank extends eastward from Farisan Seghir, including Seil Abadho, within its limits, and, from thence, stretching away in a north-westerly direction for nearly 18 miles; it consists almost entirely of shoal water and groups of small rocky islands. Jezirat Akbein, the largest of these, is $5\frac{1}{2}$ miles N.E. by E. from Ras Rasib and 8 miles westward of North Ghorab island. It is a narrow strip half a mile wide and a mile long, with two small islands off its northern end and one on its eastern side. The bank extends 7 or 8 miles north-westward of it, with shallow irregular soundings of from 3 to 10 fathoms. Between Jezirat Akbein and North Ghorab is a channel of deep water 4 miles wide.

Seil Abadho and Dhabik island.—Seil Abadho is 7 miles south-eastward of Jezirat Akbein, and Dhabik, S.E. $\frac{3}{8}$ S. $13\frac{1}{2}$ miles. Seil Abadho and Dhabik are both small round coral rocks from 10 to 20 feet high, spreading out at the top with a sharp circumference and falling in considerably towards the base. By some they are called Pie islands.

S.E. one mile from Dhabik is a 2-fathoms patch, and W.S.W. $2\frac{1}{2}$ and 3 miles from the same island are two rocky patches.

Mandhakh island, in lat. $16^{\circ} 50' N.$, and on the eastern side of Farisan Seghir island, is nearly 3 miles in length east and west, and one mile wide at the eastern end, but tapering towards the western end, where it is only half a mile wide; it is high, composed of coral, and lies in the entrance of a bight 5 miles wide, formed between the islands Farisan Seghir and Farisan Kebir, thus dividing the bight into the two inlets or khors of Seghir and Hasayif. The island is connected with the shore of Farisan Seghir on its southern side by a reef almost as wide as the island is long. On its eastern, western, and northern sides, the reef extends but a short distance from the island.

There are some dangerous patches on the rocky spit extending nearly 4 miles northward from Jebel Katab, and also East, E.N.E., and N.E. of Mandhakh island, distant from $3\frac{1}{2}$ to 5 miles. The highest part of Mandhakh bearing S.W. leads clear of all these dangers. The northern islet at the northern side of the entrance to khor Seghir bears W. $\frac{3}{4}$ S. $3\frac{1}{2}$ miles from the outer end of the rocky spit mentioned above.

KHOR SEGHIR, on the eastern side of Farisan Seghir, is westward of Mandhakh island, and has its entrance along the northern side of that island. This is a good harbour, opening out from the entrance channel into a basin $2\frac{3}{4}$ miles long W. by N. and E. by S., and $1\frac{1}{2}$ miles wide, with depths of from 9 to 12 fathoms, and perfectly sheltered from

all winds and sea. There is a small village and a grove of date trees on its western and northern sides, in which are many wells of good water. The houses are small, built of coral, and mostly in ruins. No supplies except water can be obtained, and this is said to be scarce in the hot season.

Entrance.—Depths.—The entrance to Khor Seghir is in a W. by S. direction, and is bounded on the southern side by Mandhakh island, and on the northern side by five small islands near the edge of the shore reef on that side, off the westernmost of which there is a rocky spit extending half a mile south-westward into the basin, which must be avoided. Abreast of the eastern end of Mandhakh the entrance channel is 8 cables wide, and the depth in mid-channel 19 fathoms; from thence, the channel narrows to 2 cables between the western end of Mandhakh and the islet on the northern side, and the depths decrease to 6 fathoms in the narrows, but immediately afterwards increase to 11 and 13 fathoms as the basin opens out.

Having entered the basin and cleared the spit westward of the western island before referred to, steer up about W.N.W. to the anchorage, and bring up off the grove of trees in about 12 fathoms, mud.

KHOR HASAYIF.—Southward of Mandhakh is Khor Hasayif running about 8 miles into Farisan Kebir. The entrance is between the eastern end of Mandhakh and the reef extending from Jebel Katab, on which are the two islets Seil Sharra Seghir and Seil Sharra Kebir; it is at first nearly one mile wide, with from 12 to 9 fathoms, but quickly narrows to 3 cables abreast of the south-eastern point of Mandhakh, and from thence inwards the channel has from 5 to 8 fathoms water, but is narrow and full of shoal patches. There are also some rocky islands on the western side, besides the two already mentioned, which lie on the inner part of the dangerous rocky spit before described.

The khor opens out to a width of 6 or 7 cables farther in towards the head, but is very circuitous. At $2\frac{1}{2}$ miles from the head there is anchorage in 7 or 8 fathoms, with good swinging room.

Abdulad islands.—Jebel Abdulad is a small rocky island 9 miles eastward of Mandhakh island, and is surrounded by a group of smaller islands; it may easily be distinguished by a knob or remarkable bluff at its southern end. This island and group are on a bank extending eastward from the Farisan islands, in the neighbourhood of Khor Farisan, and which, after embracing the Maraba and other islands, forms two tongues, one continuing in a north-easterly direction to a distance of 8 miles from Khor Farisan; the other, on which are the Abdulad islands, turning to the north-westward and extending in that direction about 3 miles beyond the

See chart, No. 8*d*, and Khor Hasayif, plan, No. 14.

islands, with many dangerous rocky patches, but having between it and Farisan a bight of deep soundings.

Maraba islands.—Jebel Maraba island is about 4 miles southward of Jebel Abdulad, and near a projecting point of Farisan Kebir; it is about half a mile long, rocky, and the highest island in this neighbourhood. It has a flat top or hummock of the barn shape, is surrounded by a group of small low islands, and appears from the northward as if forming part of Farisan island.

Komari island and channel.—About midway between the south-eastern point of Farisan Kebir and Maraba island, and close to the shore of Farisan, is Komari island, situated on the western side of the Komari channel through which vessels may pass from Gizan to the south-westward, and the contrary. Half a mile eastward of Komari is a 2-fathoms patch, and farther eastward are three other patches south-eastward of Hafer island and lying across the entrance of the channel, which, throughout, is about 2 miles wide. The shoals are numerous in this neighbourhood and about Farisan island, and the eye must be the principal guide to a vessel entering either way. The surveyors seldom had much difficulty in seeing the reefs.

Vessels having occasion to enter this channel from the south-westward must avoid a bank extending $2\frac{1}{2}$ miles southward from the south-eastern point of Farisan Kebir, which bank from thence turns to the north-eastward with from 3 to 2 fathoms on its outer part; and also the little island Hindiya, eastward of this bank, and S.E. 3 miles from the south-eastern point of Farisan. One mile S. by E. from Hindiya is a small island surrounded by a shoal, and S.E. one mile from the latter is a patch of from one to 5 fathoms.

Hafer island.—N.E. about 2 miles from Komari island is Hafer, one of a cluster of small rocky islands on the edge of the rocky bank which extends about 5 miles eastward from the shore of Farisan, and which forms the northern side of the channel leading out to the eastward just mentioned. The north-eastern islet of this cluster is Abu Shuri; it is situated just at the commencement of the southern tongue of the bank extending from Farisan. About half a mile north-eastward of it is a bank of rocks and sand, with from 3 to 15 fathoms water; the southern tongue of the bank extends nearly 4 miles north-eastward from Abu Shuri, is $1\frac{1}{2}$ miles wide, and has from 4 to 9 fathoms water.

Kulam island.—East $3\frac{1}{2}$ miles from the south-eastern point of Farisan is Kulam island with several small islands and rocks southward, westward, and northward of it, at distances of $1\frac{1}{2}$, 2, and 3 miles, all situated on the bank which forms the eastern and southern sides of the Komari

channel. Off the bank, westward of the southern end of Kulam, is a rocky patch almost in the centre of the channel at this part, having 10 fathoms between it and the bank, and 15 fathoms on its western edge.

Having now described the northern, eastern, and southern sides of the Farisan islands and the adjacent islets, shoals, &c., we now return to the western side where we quitted it with the description of Sarso island at p. 322.

Umm al Bisran.—E. by S. about 6 miles from the south-eastern end of Sarso is the island Umm al Bisran, about 5 miles round and rather high, but with a valley in the centre into which the salt water flows; it abounds with wood but there is no fresh water. It is about a mile distant from the north-western side of Farisan Kebir, abreast of Jebel Sayal; and, N.W. $1\frac{1}{2}$ to $2\frac{1}{2}$ miles from it, is a bank with from one to 2 fathoms water. In the channel between it and Farisan are 40 fathoms.

Za-l-Fif island.—Nearly 3 miles southward of Umm al Bisran is the northern part of Za-l-fif, which island is about $7\frac{1}{2}$ miles in length E.S.E. and W.N.W., and 2 miles wide. The land is high, and deep coves run up into the central part of the island from the north-west and south-east ends; here fresh water may be procured, but with some difficulty; wood may also be cut, and antelopes are to be found.

Za-l-fif is on the same bank as Umm al Bisran and the shoal northward of it, which bank, extending $17\frac{1}{2}$ miles south-eastward from Za-l-fif, includes Dumsuk and Kumh islands, presently described, within its boundaries. There is a deep channel from $2\frac{1}{2}$ to 4 miles wide between this bank and Farisan, and also a deep channel of less width between it and Shab Farisan, the outer bank south-westward of Za-l-fif, and on Shab Farisan is a chain of low sandy islands running in a south-easterly direction with very shallow water about them. W.S.W. about 7 miles from the north-west end of Za-l-fif is another small island near the middle of Shab Farisan.

Selwan island.—S.E. $1\frac{1}{2}$ miles from Za-l-fif, and on the inner edge, of the same bank, is Selwan island, about 2 miles in length, high, and of coral formation, having shallow water on its south-western, and deep water on its north-eastern side.

KUMH ISLAND.—E. by S. 7 miles from Selwan is Kumh island, with three high coral islands between them on the same bank. Kumh island is of circular shape and 9 miles round, with a deep gut or small khor on its southern side, and a rocky spit extending nearly a mile off its northern end, with 9 fathoms close to it, and less water towards the Farisan shore. This island is at the end of the deep water channel on that shore, is of considerable height on its southern side, and has a remarkable sand-hill on its northern end, eastward of which is a small fishing village. The

rocky spit mentioned bears N.E. by N. from this sand-hill. There are some wells of brackish water, but no cattle or other supplies.

Khor Kumh.—Northward of Kumh island is Khor Kumh, a very good bay in the southern part of Farisan Kebir, protected from all winds. It is 8 miles in length, east and west, including Tibta bay at its eastern end, and at the narrowest part between the Farisan shore and Kumh island is $1\frac{1}{2}$ miles wide, and there is the same width between the northern end of the rocky spit extending from the northern side of Kumh and the shore of Farisan. The deepest water is in the two entrances to the bay on each side of Kumh island, where there are from 20 to 23 fathoms; elsewhere, there are from 7 to 13 fathoms, except on the north-eastern side of Kumh where in the centre, there are 18 fathoms. At the north-eastern part of the bay is a well of fresh water, with, however, but a scanty supply. Farisan village is about 2 miles northward of it. Tibta bay is in this part of Khor Kumh, and affords anchorage for boats; Jebel Kasr, bearing E. $\frac{3}{4}$ S., is the leading mark for the small mersa.

Dumsuk island.—Nearly 3 miles S.S.E. from Kumh, and on the same shallow bank, is Dumsuk island. It is high, about 7 miles in circumference, with a khor or deep bay penetrating the island on its northern side and nearly dividing it into two; there are from 15 to 20 fathoms, mud, in the khor. No fresh water can be obtained on the island, but there are plenty of antelopes. Southward of Dumsuk are two circular banks in the centre of the deep channel; the least water found on them is 6 fathoms, sand and rocks.

Mahama and Umm el Zahil islands.—About 6 miles in a S.W. by W. direction from Dumsuk are the two little islands Umm el Zahil and Mahama, situated on, and near the inner edge of, the Shab Farisan; they are about a mile apart, with 6 fathoms between them.

Marrak and Towasela islands.—At 10 miles S.W. by W. from Dumsuk island is Marrak, and N.W. by N. 2 miles from the latter, is the little island Towasela, both situated on a reef which extends 2 miles southward and westward of Marrak, and one mile eastward of it, including another little island northward of Marrak.

Channel.—The reef on which these islands stand forms the south-eastern end of the Shab Farisan, across which there is no channel by which a vessel should attempt to pass anywhere between Marrak and the north-western extreme of the Shab, as has been frequently remarked. Immediately southward of Marrak, however, there is a channel $2\frac{1}{2}$ miles wide, with from 11 to 17 fathoms, between the reefs which surround Marrak and those surrounding Dohrab island.

Marrak is about 8 miles within or north-eastward of the depth of 18 fathoms, and 5 miles farther south-westward, there is no bottom at 160 fathoms.

Dohrab, in lat. $16^{\circ} 19' N.$, is a low sandy island nearly 2 miles in length north and south, and is surrounded by a reef nearly 2 miles wide, with from 4 to 14 fathoms close to it. At the distance of 7 miles S.S.W. of Dohrab, there is a shoal of 6 fathoms, but about 6 miles from its western side there are 25 fathoms, and 7 miles farther westward there is no bottom at 160 fathoms. The island is of triangular form and has a small islet close to its north-eastern side.

Simer island.—E. by S. $\frac{1}{2}$ S. 10 miles from Dumsuk is Simer island, the second islet of the same name on the Farisan bank; it is small, low, and sandy, with a reef on its northern side. About 2 miles southward of Simer there is a rocky patch.

Dahret Simer (also the second islet of its name on the Farisan bank) in lat. $16^{\circ} 28\frac{1}{2}' N.$, long. $42^{\circ} 14\frac{1}{2}' E.$, is a low sand and coral island about a mile in length, surrounded by a reef which extends $1\frac{1}{2}$ miles to the south-eastward, and has a depth of one fathom; it bears S.E. by E. $2\frac{1}{2}$ miles from Simer, and N.E. by N. $3\frac{1}{2}$ miles from Remein island. Dahret Simer lies on the western edge of the same bank, whose southern edge is within a mile of Seil Ruba island, from whence it extends 17 miles N. by E. and is from 5 to 6 miles wide. A 3-fathoms patch lies N. $\frac{1}{2}$ E. 2 miles from Dahret Simer, on the edge of this bank, across which there is no passage southward of Mazakiff island, about to be described.

N. by E. $\frac{1}{2}$ E. 3 miles from Dahret Simer is a cluster of rocks about a mile in extent, with from 7 to 10 fathoms on its southern and western sides; and, from one to 3 miles north-eastward of these rocks, are four small islands, with Mazakiff, a larger one, eastward of them.

Mazakiff, 6 miles N.E. by N. from Dahret Simer, is about a mile in length and half a mile in breadth, and is on the same shallow reef as the other four small islands. Westward of these islands is a 7-fathoms channel leading in a N.N.E. direction. N.N.E. 4 miles from Mazakiff is the southern end of a shallow patch extending northward more than a mile to near the end of the bank. The eastern edge of this bank is from 15 to 19 miles from the mainland, and there are from 13 to 30 fathoms near it.

Remein island, $4\frac{1}{2}$ miles southward of Simer, is about $1\frac{1}{2}$ miles in length, and shaped like a hatchet with the haft to the north-west, the extreme of which is the highest part; the island is principally composed of sand, and is surrounded by a reef.

Bank.—About 2 miles S.E. by S. from Remein is the north-eastern end of a bank about 9 miles long in a north-east and south-west direction,

See chart, No. 8d.

somewhat in the shape of a pear, and having on it the three islands Maran, Berri, and Rafa Berri, and also some rocks with very shoal water.

Maran, Rafa Berri, and Berri islands.—At the north-eastern end of the bank just described is Maran island, surrounded by a reef and with 20 fathoms southward of it. Rafa Berri, the westernmost of the three islands, is about 3 miles in length N. by E. and S. by W., of irregular shape, and about a mile wide. Berri is about $3\frac{1}{2}$ miles S.S.W. from Maran, and $1\frac{1}{2}$ miles eastward of Rafa Berri, of similar length and breadth to the latter, and with a small island and some rocks between their southern ends.

Seil Ruba, 2 miles E. by S. from Maran, is about a mile in length east and west; between it and the sand-bank is a gut of deep water, having from 19 to 22 fathoms, mud.

Seil Siya, in lat. $16^{\circ} 24'$ N. and 8 miles E. by N. from Seil Ruba, is a small, low, sandy island, with another small islet just northward of it, the whole surrounded by a reef with from 2 to 8 fathoms water, extending about $2\frac{1}{2}$ miles in a north and south direction; a channel of deep water of from 25 to 12 fathoms surrounds this reef.

North 7 miles from Seil Siya is the southern end of a one-fathom patch about a mile wide, which extends about 3 miles northward, with 9 fathoms at its northern end and from 21 to 27 fathoms close to it all round.

Dhu Dafr and Zuhtrat islands are on a bank of sand and coral, shaped like a man's leg and foot, 3 miles westward of Seil Siya. The depth between the two Zuhtrat islands is from 2 to 4 fathoms, and, northward of them, from 6 to 13 fathoms. Just outside the calf of the leg are three rocky patches, and between them and the reef northward of Seil Siya is also a rocky patch.

Channel.—There is a deep channel on either side of the leg-shaped bank just mentioned, and the western one is bounded by an extensive bank which runs down towards Seil Ruba, leaving a channel between its southern point and that island leading out to the south-westward.

Rokáda island.—About 3 miles southward of Seil Siya is Rokáda, with two other small islands southward of it, one distant 5 cables, the other 2 miles. W. by N. 3 miles from Rokáda, is El Onsarat island, about $1\frac{1}{2}$ miles in length and of an extraordinary shape; and W.N.W., upwards of a mile from it, is a sand-bank $1\frac{1}{2}$ miles in length east and west; this is near the northern part of the inner bank. A small island lies S.E. $2\frac{1}{2}$ miles from El Onsarat.

Simer island, in lat. $16^{\circ} 17'$ N. (the third island of that name on the Farisan bank) is 3 miles eastward of Berri, and is separated from it by the channel described above. Simer is of a triangular shape, about

8 miles in circumference, and is at the western edge of an extensive bank. A mile northward of it is an island about one mile in extent. On the western side of Simer there is a small village where brackish water may be obtained ; antelopes are plentiful.

Erdhein, a mile eastward of Simer, is a long narrow island and rather high. Between Simer and Erdhein there is another small island.

Bank.—Simer and Erdhein, El Onsurat and Rokáda, already described, with Dokeila and many others to be described, are all situated on one bank, on which the depths are from one to 20 fathoms. There are from 3 to 15 fathoms between Erdhein and Dokeila, 13 fathoms in the channel between Seil Ruba and the northern edge of the bank, 4 fathoms just westward of Simer, and 65 fathoms within a mile southward of it.

Dokeila islands, 4 miles eastward of Erdhein, are two in number, high and rocky. The south-eastern and smaller island is of triangular shape, nearly $1\frac{1}{2}$ miles long, and three quarters of a mile wide in the broadest part. The larger island has more of a horse-shoe shape, and is upwards of 5 miles in circumference ; it has a small village, a mosque, and some wells of brackish water.

North El Bodhi is a high and remarkable rock S.E. by E. $1\frac{1}{2}$ miles from the eastern Dokeila island, and has five small rocky islets close to it on its northern and western sides.

Jebel Jink and **Maflakein** are two small, high, and rocky islands on a bank of shallow water, south-westward of the Dokeila islands.

Fasht island lies south-westward of those last described, in lat. $16^{\circ} 11' N.$; it is $2\frac{1}{2}$ miles in length north and south, by one mile in breadth at the southern end, and is of good height. There is a small fishing village with a mosque in the centre of it, and near the village are some wells of brackish water. On the southern part of the island is a well of good water, but it is difficult to be obtained, the landing-place being rocky.

Sana island.—About W.S.W. 5 miles from Fasht is Sana island, on an extreme western point of the inner bank ; it is about $1\frac{1}{2}$ miles in length north-west and south-east, with two bights on its north-eastern side. There are 3 fathoms close to its northern end, the same depth on its southern side, and 53 fathoms very near its western side.

Majur.—About E.S.E. 7 miles from Sana, and S.S.E. 5 miles from Fasht, is the island Majur, also about $1\frac{1}{2}$ miles in length, with 3 fathoms close to its north-eastern side ; and, between these, but nearest to Fasht, are two small islands.

Bank.—S.S.E. $\frac{1}{2}$ E. nearly 8 miles from Sana on the parallel of 16° , and near the western edge of the inner bank, is the western end of a shoal

of from one to 3 fathoms, which extends about $3\frac{1}{2}$ miles eastward and then turns to the northward for about the same distance. There are 4 fathoms close to the northward of its western arm, and about a mile westward of it, 50 fathoms. There are several 3-fathoms patches close to the western edge of the inner bank in this neighbourhood, with 40 or 50 fathoms close by.

Zoha and Zajj islands.—E.S.E. 9 miles from Majur are the low sandy islands Zoha and Zajj on an extensive bank of irregular soundings. One mile northward of Zajj is a 2-fathoms patch, and $3\frac{1}{2}$ miles in the same direction from it a large one-fathom bank.

Rakl and Jurab islands.—South-eastward 3 or 4 miles from Zoha are the islands Rakl and Jurab, two low sandy spots with reefs off them extending a mile westward. A mile S.W. from Jurab there is a small rocky patch. Jurab is about 9 miles distant from the mainland, and from one to 2 miles eastward of it is Nasib islet and shoal forming the western boundary of the Inner channel in that vicinity, and described at page 306.

Loban island, in lat. $15^{\circ} 52' N.$, lies South $14\frac{1}{2}$ miles from Sana island, and is on the inner edge of the outer bank; it consists of coral rock with an upper layer of soft earth and sand; it is low and of inconsiderable dimensions, the water having made a passage through the lowest part, and a portion of the sides are broken down. The reef on which it stands extends a quarter of a mile off the northern end, and nearly 2 miles from the southern end, with 12 fathoms close to. South $4\frac{1}{2}$ miles from the island is a shoal with a least depth of 4 fathoms. There are 30 fathoms between Loban and this shoal, and 45 fathoms less than one mile eastward of the depth of 4 fathoms.

Berri islands.—E. by S. $9\frac{1}{2}$ miles from Loban island is the westernmost of the two small Berri islands (the second of the same name on these banks), small and low, with a fisherman's hut on the northern end of the north-eastern islet; each is surrounded by a reef, and they have 17 fathoms water between them.

Tulowein island.—S.E. $\frac{3}{4}$ E. 11 miles from Loban, and about 3 miles northward of the centre of Entufash, is the low sandy island Tulowein, with a little rise on its eastern part, and surrounded by a reef extending from it nearly one mile.

ENTUFASH ISLAND, in lat. $15^{\circ} 42' N.$, is a low sandy plain 6 miles long east and west, and about $1\frac{1}{2}$ miles wide at its centre, but $2\frac{1}{2}$ miles at its western end, where there is a hill, from which a reef extends 3 miles in a N.N.W. direction with 8 fathoms at its extreme. The reef extends more than a mile off-shore on the southern side of Entufash;

See chart, No. 8d.

there is also a bank with from 2 to 16 fathoms on it and black rocks above water, from 2 to 3 miles southward of the hill; between this shoal and the island reef is a channel, and, from it, an outlet to seaward northward of Kotama island and reef. Antelopes are plentiful on Entufash, but there is no fresh water; there are two or three huts occupied by turtle fishermen.

Anchorage.—Between Entufash and the small low islands Kubban and Kusi, off its eastern end, there is good anchorage in 4 or 5 fathoms.

Channels.—Kotama, Entufash, Kubban, and Kusi, as well as Bawarid, described at page 306, are on the northern side of a channel leading to Loheiya from seaward, and the contrary.

There are also channels between Kubban, Kusi, and Bawarid; that between Kubban and Kusi is very narrow and has from 3 to 4 fathoms; between Bawarid and Kubban there are from 5 to 8 fathoms water.

KOTAMA ISLAND, its central highest part in lat. $15^{\circ} 41' N.$, long. $42^{\circ} 16' E.$, is about 23 miles westward of Loheiya, $4\frac{1}{2}$ miles W.S.W. of Entufash, and 8 miles N.N.W. of Okban. It is about $3\frac{1}{2}$ miles in length, north and south, and $1\frac{1}{2}$ miles in breadth; it is rather high, and there is on it a hut or two and a small square building of coral containing a grave, but the island has neither water nor inhabitant.

Kotama has a deep-water channel on its eastern side, and the other sides are bordered by a bank of sand and coral of irregular depths, from 10 to 4 and 2 fathoms for 2 miles off-shore on the western side; southward of the island, it extends upwards of 6 miles in a S.S.W. direction, also with irregular soundings of from 8 to 22 fathoms. This bank forms the outer southern extreme of the Farisan bank, as Kamaran island forms the inner.

Okban island, between Kotama and Kamaran islands, with the adjacent channels, will be found described at page 313.

See chart, No. 143.

CHAPTER VIII.

EAST COAST OF RED SEA FROM KAMARAN BAY TO
CAPE BAB-EL-MANDEB, AND SOUTH COAST OF
ARABIA FROM THENCE TO ADEN.(Lat. $15^{\circ} 13'$ N. to lat. $12^{\circ} 35'$ N.; long. $42^{\circ} 35'$ E. to long. $45^{\circ} 3'$ E.).

VARIATION IN 1900.

Strait of Bab-el-Mandeb, $3^{\circ} 0'$ W. | Aden - - - $2^{\circ} 45'$ W.

The Coast.—From Ras el Bayadh, fully described at page 311, round Ras Isa, 5 or 6 miles to the south-eastward, the shore is bordered by a reef with deep water close to. Between Ras Isa and Ras el Jedir, the coast falls back forming Isa bay, where a ship may find temporary anchorage in from 8 to 5 fathoms, sheltered from northerly winds, but she must quit if the wind shifts to the southward or westward.

Rishah island, about $3\frac{1}{2}$ miles S.S.W. $\frac{1}{2}$ W. from the western extreme of land $1\frac{1}{2}$ miles southward of Ras el Bayadh is a low sandy island or sandbank partially covered with scrub, and surrounded by a reef which extends one-third of a mile from the three sides running into the land at its northern corner. The 5-fathoms line is about $1\frac{1}{2}$ miles distant from the southern and northern parts, but on the east and west the reef is fairly steep-to. In mid-channel between it and the mainland, 3 miles distant, there are 13 to 15 fathoms water.

Rishah being a useful mark, but difficult to see when approaching Kamaran from the southward, has had erected on it a stone pillar beacon about 25 feet high, painted white, and visible from one to 5 miles, according as the day is bright or dull.

When there is a strong south wind and heavy sea, reaching home to the coast, a fairly good anchorage may be obtained to the northward of Rishah, if a stranger is not able to make the entrance to Kamaran passage easily. At night, anchorage water may readily be picked up by the lead, and it is better to anchor than to stand on and off, on account of the uncertain currents, and very great difficulty of fixing the ship's position accurately by bearings of the low land which it is almost impossible to distinguish.

See chart, No. 143, and plan, No. 14.

Ras Kethib, S.S.E. $\frac{7}{8}$ E. 20 miles from Ras Isa, is the extreme point of a tongue of low land extending northward 4 miles from Ras el Jedir, and forming a bay or inlet on its south-eastern side. Eastward $2\frac{1}{2}$ miles from Ras Kethib is a low island on a reef extending $1\frac{1}{2}$ miles off shore; and, nearly 6 miles northward of Ras Kethib is another projecting cape, without a name; the bay between them as well as the inlet eastward of Ras Kethib having depths both irregular and shoal.

Ras el Jedir.—About 4 miles southward of Ras Kethib is Ras el Jedir, and shoal water appears to extend a long way off between these two points. About 2 miles westward of Ras el Jedir, there are only 2 fathoms, with 3 fathoms continuing for 4 miles north-westward of it. Midway between the shoal and Ras el Jedir is a rock and islet.

Shoal.—The existence of shoal ground extending much farther south-westward from Ras el Jedir than was previously supposed, and lying about 11 miles W. by N. $\frac{1}{2}$ N. from Hodeida, was reported in 1883, by Commander R. Evans, H.M.S. *Lily*. This shoal ground, over which the *Lily* passed in $4\frac{1}{2}$ fathoms (the bottom, apparently coral, being clearly visible), lies with Ras el Jedir bearing E. by N. 6 miles. From this position, discoloured water appeared to extend northward about 4 miles, and eastward with a southerly curve to Ras el Jedir. H.M.S. *Melita* passed over part of this shoal ground in 1895, and found its edge well marked, the water inside the line being a light green.

HODEIDA, in lat. $14^{\circ} 47'$ N., long. $42^{\circ} 56'$ E., and about 5 miles south-eastward of Ras el Jedir, is a large town with lofty buildings; the North fort and grand mosque minarets are conspicuous marks; the South fort, in ruins, is scarcely visible.

Hodeida is one of the coffee ports and has a considerable bazaar where supplies may be procured, but there is no regular supply of coal, though it may, at times, be obtained. There is no wharfage nor any of the usual conveniences of a trading port, though the traffic is considerable; and, so exposed is the place, that landing is difficult, and, at times, impossible with the wind between South and West. The principal exports are, coffee, hides and skins, pearls, gum arabic, mother of pearl shells, and Fuller's earth. In the year 1897, the exports amounted to 712,660*l*. The chief imports are cereals, bread-stuff, rice, piece goods, sugar, silk, condiments, and petroleum; the total value of imports in 1897 was 705,231*l*.

The aggregate tonnage that entered and cleared at Hodeida in 1895 and the two subsequent years was respectively, 86,551, 101,695, and 47,558 tons, of which more than half was British. In the last year, 39,458 tons was carried in 92 steam vessels, the balance being almost exclusively in small sailing native craft. The trade here was greatly affected by the plague on the west coast of India, and by the war between Turkey and Greece.

The steam-vessels that touch here do so irregularly, and the arrangements are frequently altered; this has especially been the case since the break out of the plague. In 1897, in addition to other vessels, the Red Sea Trading Company called once a month, a steamer of Magri, Rini and Company at irregular times, and weekly mails were carried by local steamer to and from Aden.

There is said to be plenty of good water at Hodeida, which the natives will bring off in their own boats. The environs of the town are less sterile than the surrounding country and have some gardens of palms and other plants. In 1897, the population was estimated at over 50,000 (but no census has ever been taken), who are more or less engaged in commercial pursuits.

Telegraphic communication.—Direct telegraphic communication exists between this place and Sana, Mokha, and Loheiya. Perim connects Hodeida with the rest of the world.

Winds and Weather.—From April to September, 1897, north-easterly and north-westerly winds prevailed, and during the rest of that year strong south-westerly winds blew, and many people at Hodeida suffered from ague and rheumatism.

Anchorage.—Vessels may anchor 2 miles from the shore in about 4 fathoms, just westward of some small patches of reefs in the roads, for which a good look-out is necessary, as the water does not always break on them. Between 2 and 3 miles southward of the town, a shoal spit runs off about a mile, with one fathom at its extreme. In 1888, the depths in the neighbourhood of the anchorage were said to be less than are shown by the chart.

Soundings.—The soundings off Hodeida are very regular, being 5 fathoms at the distance of $4\frac{1}{2}$ miles, and 7 fathoms at 8 miles in a W. by S. $\frac{1}{2}$ S. direction from the town: farther southward, as far as the entrance of Khor Ghuleifaka, shoal water of 2 and 3 fathoms extends upwards of 3 miles from the shore.

RAS MUJAMELA is the northern extreme of a low sand-bank or island only 3 to 10 feet above high water, and formerly connected with the mainland by a narrow strip of sand about 12 miles long in a S.S.E. direction, thus forming Khor Ghuleifaka on its eastern side. The sea has, however, washed an opening through the sand-spit into the Khor about $5\frac{1}{2}$ miles southward of the Ras, through which there is reported to be as much as 3 fathoms water.*

* In February 1888, H.M.S. *Albacore* reported the existence of a signal station, in connection with the suppression of the slave trade, established on Ras Mujamela in charge of two Egyptian soldiers.

See plan, No. 14, and chart, No. 143.

Shoals.—The water is shoal, with depths under 5 fathoms, for 3 miles westward of Ras Mujamela, and thence within a line running about S. by E. $\frac{1}{4}$ E. (or roughly parallel to the shore) for 12 miles up to the small sand-hill of Kett-el-Makhayish.

KHOR GHULEIFAKA.—Ras Mujamela, the north-western point of Khor Ghuleifaka, cannot be seen from the deck when more than 5 miles distant; the best guide, therefore, in approaching the Khor is the bearing of Hodeida, the great mosque minaret of which may be seen at a distance of 12 or 14 miles distant. The minaret bearing N.E. leads well clear of the shoal ground westward of Ras Mujamela; and with the Ras bearing anywhere between East and S.S.E., the Khor may be steered for, but in hazy weather much caution is requisite as the shoals are steep-to.

On the mainland, abreast of Ras Mujamela, there is a sand-hill about 100 feet high, and on the coast opposite the southern end of Khor Ghuleifaka is the Kett el Makhayish, a small sand-hill in the shape of a haycock about 40 feet high, which may be distinguished in clear weather when approaching Ras Mujamela from the southward.

Entrance.—Depths.—The entrance to the Khor is between the eastern extreme of the low spit extending $2\frac{1}{2}$ miles eastward from the Ras, beyond which, shoal water, with 9 feet at its extreme, extends at least $5\frac{1}{2}$ cables farther, on the starboard hand; and the shore bank, extending $1\frac{1}{2}$ miles from the eastern shore and overlapping the spit from the western side, on the port hand. The entrance is very narrow and winding, and no more than from 3 to 4 fathoms can be depended on in the best water. Inside, there is extensive anchorage ground in from 3 to $4\frac{1}{2}$ fathoms; the Khor is thought to be gradually silting up.

Anchorage.—Northward of Ras Mujamela, there is anchorage with shelter from southerly winds in 4 to 6 fathoms; within the Khor there is protection from all winds. When in the khor, a sailing vessel would find some difficulty in quitting the anchorage with a north-westerly wind.

Water.—On the eastern side of the khor, abreast of the entrance, is a place called Shurein, near which, at about a mile or more inland over a beach of soft sand, there are some wells of good water.

Tides.—At Ras Mujamela, it is high water, full and change, at about 1 h. 10 m.; the rise is about 4 feet.

The Coast.—From the western extreme of land at Ras Mujamela, Ras Muteina bears S. by E. $\frac{1}{4}$ E. 38 miles; the coast between them consists of low hills backed by high mountains, and is nearly straight in direction. Ras Muteina is 17 miles distant from the nearest part of Jebel Zukur island. S.S.E. 24 miles from Ras Mujamela is Kett Koreish bluff, standing close to the shore.

See chart, No. 143, with plan of Khor Ghuleifaka.

Water.—About 7 miles northward of Ras Muteina is Ras Zebid, off which is a small shoal on which the sea breaks, and about one mile north-eastward of it is an excellent spring of fresh water emptying itself into the sea. The rushes growing about its mouth are easily distinguishable from the anchorage off it in $4\frac{1}{2}$ fathoms, and there are also some trees and bushes in its neighbourhood by which the locality may be known. It is to be observed that this being an open coast, if there is any surf on the beach it is difficult and even dangerous to attempt watering here.

Soundings.—Between Ras Mujamela and Ras Muteina, depths of 5 fathoms will be found from $2\frac{1}{2}$ to 6 miles off-shore, the soundings outside the 5-fathoms line gradually deepening. The deepest water found between Jebel Zukur and Ras Muteina is 45 fathoms.

Shoals.—Northward of Ras Muteina, from one to $2\frac{1}{2}$ miles distant, there are three rocky patches, a mile from the shore, on which the sea breaks.

The Coast from Ras Muteina to Mokha, distant 41 miles S. $\frac{3}{4}$ E., forms a slight indentation, in which the soundings decrease with regularity towards the shore; throughout this space, a depth of 5 fathoms will be found at from $1\frac{1}{2}$ to 2 miles from the land.

Kubbat el Himar is a point of land S.E. 9 miles from Ras Muteina, marked by a small white mosque.

Water.—About a mile south-eastward of Kubbat el Himar is the small village of Sahari, where good water may be procured. It may also be obtained at the villages of Khaukha and Musa, 7 and 11 miles southward of Kubbat el Himar. Musa may be known by a small white mosque on its point.

Jebel Musa, or the **Three Sisters**, are three pyramidal hills 6 or 7 miles inland, E.S.E. from Musa village, and N.N.E. $\frac{5}{8}$ E. 23 miles from Mokha.

Anchorage.—The soundings being regular along the coast to Mersa Fejera and Mokha, a vessel in want of water may anchor in any convenient depth off the places we have mentioned as supplying water.

Mersa Fejera, $7\frac{1}{2}$ miles southward of Musa, is an anchorage in less than 4 fathoms, only fit for boats; southward of it, the coast projects a little and in some degree serves to break the swell caused by southerly winds.

MOKHA, often spelt **Mocha**, in lat. $13^{\circ} 19' N.$, lies in a small bay between two low points about $1\frac{1}{2}$ miles apart, on each of which is a fort in ruins. Between the forts extends the sea-wall, which protects the town and allows access to it by a single gate only; in front of the gate is a stone pier or jetty. The town extends in a North and South direction

along the shore, is about half a mile square, and, from the sea, has an imposing appearance. The houses generally are large, white, and built of stone, but are either in ruins or in a state of great decay; there are several mosques with lofty minarets. The highest, in the eastern part of the town, 118 feet high, is a good landmark. The streets are very narrow, and in many places impassable from the débris.

Mokha no longer enjoys its ancient reputation as a trading port, and, notwithstanding its favourable position, presents few traces of its former prosperity. In 1824 it contained about 20,000 inhabitants; but in 1882 scarcely 1,500 were within its walls. The coffee plantations for which Mokha was once celebrated lie inland about 45 miles from the town, but the trade in that article is now very small. The decline of Mokha, once the principal seat of commerce in the Red sea, appears to have been coincident with the establishment and rise of Aden as a British port.

Of the high land within Mokha, there is a remarkable piece of table-land called Jebel Nar or Barn, which, when in line with the mosque at Mokha, bears E. $\frac{1}{2}$ S.; southward of this and south-eastward of Mokha is South peak, another remarkable part of the highest land, appearing as if covered with ruins.

Supplies.—The country round Mokha is an arid sterile plain without fresh water, the town being supplied by an aqueduct from the village of Musa, at the foot of the hills, 24 miles to the northward. The bazaar is poorly supplied, except with dates.

Tides.—It is high water, full and change, at Mokha, at noon; springs rise $4\frac{1}{2}$ feet. At spring tides, there is often only one high and one low water in the 24 hours; at neaps, there are two tides in the day, but the times are irregular.

The flood stream sets to the northward, the ebb to the southward at from one to 2 knots an hour. The duration of the streams is much affected by the winds. Close inshore, during strong southerly winds, it often happens that the southerly stream sets for 16 hours at a time, and the northerly stream for 6 or 8 hours. In the deep water outside the shoals, the northerly current is permanent during winter and spring.

Mokha roads are westward of the town, and as there are many shoal patches in the neighbourhood, care is required in approaching the anchorage. The principal dangers are the North shoals, with from 10 to 18 feet water; and the South shoals, with a minimum depth of 13 feet, surrounded by from 4 to 6 fathoms water.

The North shoals are at the north-western extreme of the shoal ground stretching from the South fort; from their shoalest spot of 10 feet, the North fort, a conspicuous object, bears E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles, but

many shoal patches of from 15 to 18 feet lie from $1\frac{1}{2}$ cables north-eastward to $3\frac{1}{2}$ cables north-westward of the 10-foot patch.

The South shoals lie S.S.W. $\frac{3}{4}$ W. about $2\frac{1}{4}$ miles from the North shoals, S.W. by W. $\frac{1}{4}$ W. nearly 4 miles from the high minaret in the eastern part of the town, and about 2 miles westward from the nearest land; they cover an extent of nearly a mile in a north-west and south-east direction with 13 feet least water; between them and the shoal ground extending off-shore, there is a channel nearly three-quarters of a mile wide, with from 5 to 7 fathoms.

Besides the shoals just described there are patches of 28 feet bearing W. $\frac{1}{2}$ S. $4\frac{1}{4}$ miles from the high minaret.

Directions.—From the northward.—The high minaret of Mokha kept open southward of the bluff of Jebel Kateri, and bearing E. by S. $\frac{1}{4}$ S. leads 2 cables northward of the North shoal. When the South fort is in line with a distant sharp peak bearing S.E. by S. a vessel may steer towards it and anchor in 20 or 21 feet with the minaret bearing E. $\frac{1}{2}$ S.

Jebel Kateri is a long wedge-shaped hill terminating in a steep bluff at its northern extreme; *see view on chart.*

From the southward.—In a vessel drawing more than 16 feet, it is advisable to keep outside the South shoals, south-westward of Mokha, by not shoaling to less than 11 fathoms, until the North fort bears N.E. by E. $\frac{1}{2}$ E.; then steer for it, until the South fort bears E. $\frac{1}{2}$ N.; the course should then be altered to N. by E. $\frac{1}{2}$ E. until the high minaret opens southward of the bluff of Jebel Kateri bearing E. by S. $\frac{1}{4}$ S., and then proceed as before directed.

Following these directions, a ship will pass inside the shoal patches lying W. $\frac{3}{4}$ S. from Mokha high minaret; but should it be desired to pass outside all, she may continue her course, guided by the soundings, until the marks are on for entering the roads from the northward.

As the currents are strong, vessels are recommended to moor.

The Coast from Mokha until within 4 or 5 miles of cape Bab-el-Mandeb is nearly straight and trends in a S. by E. $\frac{3}{4}$ E. direction; it consists of low hills backed by lofty mountains in the distance.

Soundings.—The soundings along this part of the coast are tolerably regular, and the lead is a good guide in approaching it. By not standing into less than 15 or 12 fathoms a vessel will avoid all dangers near it.

ZI HILL is a small but remarkable piece of rocky land, 360 feet high, shaped like a wedge, and standing close to the beach. It bears S. by E. $\frac{3}{4}$ E. 24 miles from the town of Mokha; there is no other hill like it in the vicinity, the land about it being generally low with high hills

in the interior; it is more conspicuous as seen from the southward than from the northward. Jebel Dubaala, 5 miles N.E. $\frac{1}{2}$ E. of Zi hill, is 1,150 feet high.

Zi shoals.—The coast by Zi hill, and the shore southward of it, has shoal water extending 5 or 6 cables therefrom, with 5 fathoms on its outer edge; but at 4 and 5 miles southward of Zi hill, shoal water extends $1\frac{1}{2}$ miles off-shore, and there are two reefs at its edge with 3 fathoms between them and the shore, and 5 or 6 fathoms close to their outer edges. The southern reef has 2 fathoms water over it.

Chiltern shoal.—About $2\frac{1}{2}$ miles southward of the last described reef, in lat. $12^{\circ} 50\frac{1}{2}'$ N., long $43^{\circ} 24\frac{1}{2}'$ E., is a shoal discovered by the s.s. *Chiltern*, in 1890; it is 7 or 8 cables long north-west and south-east, and from it, Zi hill bears N. $\frac{5}{8}$ E. $6\frac{3}{4}$ miles, the nearest part of the shore being distant about $2\frac{1}{2}$ miles. A depth of 3 fathoms was found on the northern part of the shoal, but the southern portion was not sounded and may have less. There are 7 fathoms eastward of the shoal and 5 fathoms on its western side.

About 13 miles southward of Zi hill the coast ceases trend S. by E. and turns south-westward terminating about 4 miles farther, in the headland of which Ras Bab-el-Mandeb is the south-western extreme and Ras Sheikh Syed the north-western.

Port Sheikh Syed is a small inlet in this latter line of coast, about 2 miles north-eastward of Ras Sheikh Syed; it runs in about $2\frac{1}{4}$ miles in a south-easterly direction, with a breadth varying from about 50 yards at the entrance to nearly a mile at the inner end. The water off the entrance is shoal, there being 3 fathoms about 8 cables westward of the mouth. The entrance is almost closed by two banks which dry at low water. Between them there is a narrow 3-feet channel. At less than a mile within the inlet, the water shoals from 3 or 4 feet to one foot, and the whole of the upper end dries at low water.*

Tides.—At port Sheikh Syed neaps rise 4 feet. In the entrance of the inlet, the tides run at a rate of 3 or 4 knots an hour.

Ras Sheikh Syed, $1\frac{1}{4}$ miles N. by W. from Oyster island, is about 15 feet high, and has shoal water extending 3 cables westward of it; there is a good landing-place just southward of the Ras.

RAS BAB-EL-MANDEB, or the cape of the Gate of Affliction, a prominent headland, wedge-shaped, sloping towards the sea with low

* Port Sheikh Syed was purchased and taken possession of by a French company in the year 1870 for the purpose of forming docks. In 1888, a large house which had been built on the beach fell down, and the site of the French works is now only marked by a heap of stones.

See chart, No. 143, and plan, No. 2,592.

land behind it, is the south-western extreme of Arabia, and is the north-eastern point of entrance to the Red sea from the gulf of Aden. The highest land near the cape, Jebel Manhali or Quoin hill, is $1\frac{1}{2}$ miles east-north-eastward of the Ras and is 886 feet high; it is said to be of volcanic formation. From it, the land slopes down to the southward and westward, so that eastward of the Ras several rocky points are formed projecting half a mile beyond the general line of the shore, and between them are small bays affording shelter to small craft; here African traders sometimes land their sheep, preferring to drive them to Mokha rather than risk a tedious voyage back from that place against southerly winds. About $2\frac{1}{2}$ miles eastward of the cape is a square dark hill named Turba, on which are some ruins and an old village. The steep rocky points here form one of these sheltered anchorages.

On Warner point, the fourth point eastward from Ras Bab-el-Mandeb and 2 miles from the Ras, some Turkish batteries have been erected.

Sheikh Malu, or Oyster island, is a small rocky islet 57 feet high off Ras Bab-el-Mandeb, its western extreme extending about 3 cables from the shore, with which its eastern end is connected by a shoal and rocky bank; north-westward and south-eastward of the island there is good anchorage. Off its north-western side, shoal water extends westward between 3 and 4 cables on what is really the shore reef of the mainland, from which between Oyster island and Ras Sheikh Syed the 5-fathoms contour-line is distant about 6 cables. From its south-western and southern sides shoal water extends about $1\frac{1}{2}$ cables.

ASPECT of the LAND.—About 2 miles north-eastward of Jebel Manhali is a small range of hills named Jebel Heikah, extending 3 miles in a N.N.W. direction, attaining 540 feet in height, and of irregular outline. The intervening land is low, sandy, and barren, but in the valley a few bushes and patches of grass may occasionally be seen, on which antelopes are found to subsist. The inlet of Port Sheikh Syed, just described, whose entrance is from the Red sea, extends half way through this valley towards the Gulf of Aden shore.

North-eastward of Ras Bab-el-Mandeb, about 15 miles distant, is Jebel Hejaf, a low range of hills extending about 16 miles eastward in a direction nearly parallel with the southern shore of Arabia; they are of dark aspect, irregular in outline, and terminate in a bluff at their western end.

Jebel Arrar, or Chimney peaks, is a remarkable range of mountains about 25 miles north-eastward from Ras Bab-el-Mandeb; they extend in a N.W. and S.E. direction for about 20 miles, and have an irregular outline which shows as a continued chain of peaks, terminating south-eastward in Barn peak, a square-shaped hill with a peak in its centre. These mountains have a dark gloomy appearance, and are always visible in

See plan, No. 2,592, and chart, No. 8e.

clear weather when approaching the strait of Bab-el-Mandeb, either from the Red sea or gulf of Aden; they are bounded northward by a higher range of more distant mountains.

Strait of Bab-el-Mandeb and Perim island.—For description and directions, *see* pages 230–232.

GULF OF ADEN.—**General remarks.**—Full details of the changes of climate, winds, weather, &c., which may be anticipated on entering the gulf of Aden from the Red sea are given in Chapter I. of this work (*see* also pages 230–232). It is now only necessary to remind the mariner of the marked difference, before mentioned, between the navigation of the gulf and the Red sea, caused by the entire absence in the former of all central dangers and the general safety of approach to its shores as compared with the latter, the only real dangers in the gulf of Aden being the reefs off Zeila, on the African shore, and the bank of broken ground off and between Ras al Ara and Ras Kaáu on the Arabian shore.

GHUBBET al HAIKAH.—The coast from Ras Bab-el-Mandeb trends in a north-easterly direction about 7 miles, when it turns abruptly eastward for about 21 miles to the western part of Ras al Ara, forming Ghubbet al Haikah, which has low sandy shores, and affords a convenient and smooth anchorage for vessels working into the Red sea against the strong north-westerly winds in June and July. A vessel standing into this bay should not approach nearer than 10 fathoms by day, or 14 fathoms by night, to avoid the 3-fathoms patches which lie about one mile from the shore. The bank of soundings extends to 12 or 14 miles off this bay.

Water.—At Sakiab, in the western part of the bay, is a group of palm trees, and 2 miles eastward is a well of good water; firewood is abundant.

Barn peak, at the south-eastern end of the Jebel Arrar range, already described, is about 10 miles inland, northward of the eastern end of Ghubbet al Haikah.

RAS AL ARA is a projection, 11 miles in width east and west, with the Ghubbet al Haikah on its western and Khor Omeira on its eastern side. The centre of this projection is the southern extreme of Arabia; it is a very low, sandy, rounded point, difficult to distinguish at night, and one of the most dangerous points on the coast, being in the direct route of vessels proceeding to or from the Red sea, and having a bank of hard sand extending $3\frac{1}{2}$ miles off-shore southward and south-eastward of it, with one or two dangerous rocky 6-foot patches. One of these patches, with 9 to 11 fathoms close south-westward of it, lies with Ras al Ara bearing N. $\frac{1}{4}$ W., distant nearly $3\frac{1}{4}$ miles. Several vessels have been wrecked in this locality. This bank, which extends as far as Khor Omeira, is the more dangerous as the water suddenly shoals from 15 fathoms, and a ship standing inshore

with good headway would hardly have time to get a second cast of the lead before touching the ground. It is advisable not to approach nearer than 15 fathoms by day or 20 fathoms by night.

CAUTION.—The greatest caution should be observed when navigating in this neighbourhood, that is to say, anywhere between Ras al Ara and Ras Kaáu.

Anchorage.—There is good anchorage in the small bay westward of Ras al Ara, affording shelter against the strong winds of the North-east monsoon; the shore around the bay is rather steep.

Water.—There is a supply of fresh water in this bay near a grove of date trees.

Caution.—The natives on this part of the coast should be avoided, being of a hostile and ferocious character.

Khor Omeira is a remarkable inlet, its entrance being about 8 miles eastward of the southern extreme of Ras al Ara; it is $4\frac{1}{2}$ miles long by $2\frac{1}{2}$ miles wide, and is almost land-locked by a narrow spit of sand which projects from its eastern shore, and forms its southern boundary, leaving a narrow entrance with 6 feet water at its western end; in entering, this depth does not increase for 2 miles, and in some places there is even less water, but it then opens out into a fine basin with from 3 to 6 fathoms at low water; at high water, the low southern spit of sand is nearly covered.

Jebel Kharaz, or the Highland of St. Antonio, reaches the height of 2,772 feet above the sea at its northern peak, while its southern bluff rises 2,085 feet almost immediately from the northern shore of Khor Omeira. On the western side of the summit of the northern peak, is a ruin of roughly hewn stone, without date or inscription, but sufficiently remarkable to give a name to the mountain amongst the superstitious natives, by whom it is called Jebel Jinn, or Genii hill, on account of some mystery attached to the building. The mountain is of limestone and granite formation.

The shore everywhere between Ras al Ara and Ras Kaáu is low and sandy, with a few bushy shrubs, except that here and there a rocky point occurs,

RAS KAAU, approximately about 130 feet high, showing as a black well-defined bluff, is a projecting point 17 miles eastward of the entrance to Khor Omeira, and from its dark appearance is known by the name of Black cape. At 3 miles inland is Jebel Kaáu, a remarkable saddle hill rising 798 feet above the sea; three other small hills lie south-westward of it near the shore.

Parceval shoal.—This shoal, of $12\frac{1}{2}$ feet water, was discovered in 1887 by the French ship of war of that name touching on it. From it, Ras Kaáu bears N. $\frac{3}{4}$ E. 4 miles, and Ras Imran, E. by N $\frac{1}{2}$ N. 20 miles, a depth of $8\frac{1}{2}$ fathoms was found at one cable outside the shoal, and from the position as given it would appear to be just outside the 20-fathoms contour-line as charted.

Sand-banks.—Between Khor Omeira and Ras Kaáu, a dangerous sand-bank extends 4 miles off-shore, and no vessel should approach within the depth of 20 fathoms; for although the limit of the bank may sometimes be seen from the masthead of a vessel, much caution is always necessary in approaching this part of the coast, as the water shoals very suddenly. On some parts of the bank, the water breaks at low water, springs.

BANDER IMRAN.—Eastward of Ras Kaáu, the shore is still flat and sandy for a distance of 18 miles, as far as Ras Imran, but receding between the two points, and forming Bander Imran, a bay nearly 5 miles deep; the land towards the interior is low, flat, and covered with bushes. The soundings in the bay are regular, there being 12 and 13 fathoms at 2 or 3 miles off-shore, and there are no dangers; the bottom is principally clay and sand, with an occasional patch of rock. There is excellent shelter from easterly winds at its eastern end under Ras Imran.

Ras Imran is the south-western extreme of a small rocky island divided from the mainland by a narrow channel almost filled up with rocks; off its western side are three small rocks of considerable height, with deep water close outside them. The point of the mainland is a rocky promontory, rising 712 feet above the sea, which, including the island, projects in a south-westerly direction $2\frac{1}{2}$ miles from the general line of coast, and divides Bander Imran from Bander Fukom.

Ras Imran is the eastern boundary of the territory of the Subaiha tribe; these people, though numbering about 12,000 persons, are but little known; their general character is that of being suspicious of strangers, revengeful, and treacherous.

Bander Fukom is the bay about 5 miles wide between Ras Imran and Ras Fukom, the western point of Jebel Ihsan. Near its centre is Jezirat el Juhub, a small round island, with a rock, barely covered, about 3 cables E.S.E. from it, having from 5 to 6 fathoms water between it and the island; a shoal patch extends a short distance north-westward of the island. On the western side of the bay is the tomb of Sheikh Summara, surrounded by a few fishermen's huts. Near the tomb is Jezirat Abu Shamma, a small, dark-coloured peak, and westward of it are two small anchorages for boats. The land surrounding the bay is a low, dreary,

swampy tract; the depths in the bay are regular, varying from 3 to 6 or 7 fathoms, with a bottom of sand and mud.

JEBEL IHSAN is a mountainous mass of granite, forming a peninsula 6 miles long by 3 miles in breadth, and is a portion of the British territory of Aden, sometimes called Little Aden; its highest peak, in the form of a sugar-loaf, rises to a height of 1,237 feet above the sea. This promontory has numerous projecting points, to each of which the Arabs have given a name:—On the south-western side are Ras Fukom and Ras Alarga; the most southern, Ras Mujallab Heidi, is the western limit of Bander Sheikh, a small bay. Ras Abu Kiyama divides this bay from khor Ghadir; and the white tomb of Sheikh Ghadir is about 1,100 yards northward of the extreme point of Ras Abu Kiyama. On the southern and eastern sides of the promontory are nine rocky islets, nearly connected with the main at low water, springs; one is in the small bay of Bander Sheikh, eastward of Ras Mujallab Heidi; two lie in the middle of the entrance to khor Ghadir, and northward of them extends a reef of rocks for about 2 cables; another, Jezirat Salil, south-eastward of which is a rock awash, lies off Ras Salil, the south-eastern point; and five of them off the north-eastern bluff, about one mile from the shore. The bays and islands around the peninsula are safe to approach, the depths decreasing gradually towards the shore.

At the eastern end of Jebel Ihsan is a remarkable double peak of granite, 700 feet in height, which, from its peculiar shape, is known by the name of the Ass's ears. The outline of the whole of Jebel Ihsan is very picturesque, *see* view on chart; a deep ravine winds through the hilly track from Bander Fukom to Bander Sheikh. The land to the northward is low, and on the eastern side, immediately at the back of the mountains, a deep inlet, named khor Bir Ahmad or Seilán, extends 3 miles inland to the westward.

Bir Ahmad is a small fort and village containing about 250 inhabitants; it is about 3 miles inland from the beach at the head of Bander Tauwahi or Aden West bay, and $6\frac{1}{2}$ miles North of the Ass's ears, and is the residence of the chief of the Akrabi tribe. About 2 miles north-eastward of Bir Ahmad is the village of Seilán.

The territory of this tribe does not exceed 20 square miles, with a population of about 600 males; they are a treacherous race, and not to be trusted; their territory is bounded on the north-east by the Abdali and Haushábi, and westward by the Subaiha tribes.

The chief produce of the country is jowari (millet), of which quantities are exported.

ADEN PENINSULA is high and rocky, extending 5 miles in length in an east and west direction, by 3 miles in breadth; the highest

See Aden and adjacent bays, plan, No. 7.

part bears the name of Jebel Shumshum, from the turreted peaks on its summit, of which the highest is 1,776 feet above the sea, and is visible at a distance of 40 miles in clear weather; it is almost entirely composed of limestone. The peninsula bears much resemblance to the rock of Gibraltar, and came into the possession of the British in 1839. The peninsula promontory of Aden is almost divided from the mainland by Khor Maksa, a creek on the eastern side of the harbour similar to that behind Jebel Ihsan, which gives these lofty promontories, not very unlike in appearance, the aspect of two sentinel islands guarding the approach to the magnificent bay they enclose.

Numerous rocky points project from this mass of mountains, forming small bays and affording shelter for boats. Commencing on the north-western side, Ras Hujaf forms the southern and western limit of the inner bay at the eastern end of the Inner harbour; immediately off it is the Jeramah rock, marked by a beacon. Half a mile westward of Hujaf is the rocky point of El Ainah; and, a quarter of a mile beyond, is the island Sheikh Ahmad or Flint rock; 3 cables farther westward is the point Ras bin Jarbein; rather more than half a mile beyond is Ras Marbut or Steamer point; and at about the same distance again, is Ras Tarshein, the extreme western point of the promontory, the high peak $1\frac{1}{2}$ miles eastward of which rises 970 feet above the sea. Turning from thence south-eastward, the same bold coast continues for $2\frac{1}{4}$ miles as far as Round island or Jezirat Denafa; one mile beyond which is Ras Sinaila, the southernmost point of the peninsula.

The Territory of Aden was formerly a portion of that held by the neighbouring friendly Abadil tribe; it is under the administration of the Government of Bombay, and comprises an area of about 35 square miles. *See page 353.*

The official establishment of the Political Resident is at the Residency, on the northern side of Ras Tarshein.

Town.—The town of Aden is on the eastern side of the peninsula, near Aden East bay, and about 4 miles by road from Aden harbour. It is built on a plain rather more than half a mile square, encircled on the land side by singularly pointed hills, with its eastern face open to the sea, while immediately in front is the rocky fortified island of Sirah; *see view on Chart.* This island, which commands the eastern bay and town of Aden, is a triangular rock about 430 feet high towards the southern end, and half a mile long by 3 cables wide. The passage which formerly existed between it and the mainland is now filled by sand; consequently, at low water, the island is joined to the coast.

Communications.—Aden has no railway communication; in all other respects its facilities for communication are unrivalled. By

See plan, No. 7.

submarine cable it is connected directly with Bombay, Zanzibar, Perim, and Suez, and indirectly, therefore, with all parts of the world; the home rate is 3s. 9d. per word. By steamers, mail or otherwise, it has almost daily communication with all ports of importance; and, by dhows chiefly, with the ports of the Somali coast.

The submarine telegraph station is on a prominent point in the centre of the bay southward of Ras Tarshein. Vessels are strictly forbidden to anchor near the starting point of a cable. The local telegraph office is near the P. & O. Co.'s coal stores in the Inner harbour.

Trade.—Aden was declared a free port in 1850, and the only duties now charged are on spirits, wine, opium, arms, and salt; since that date it has engrossed nearly the whole of the coffee trade formerly enjoyed by Mokha. Being a port for transshipment, the imports and exports are for the most part the same, the local consumption, except as regards coal, which may be considered import only, being small. The principal articles of trade are hides, skins, ivory, feathers, gums, grain and pulse, &c., brought chiefly from the African coast; coal, silk and cotton goods, dates, flour, cattle, sheep, tobacco, malt liquors, wines and spirits. The aggregate value of the trade at Aden in 1897, was about 5,460,000*l.*, which was considerably less than in the two preceding years. The total tonnage of vessels entered and cleared at Aden in the year 1897, was 4,247,382 tons.

Quarantine.—Quarantine is enforced against Indian ports when Egypt quarantines them, and against other ports as necessity arises.

Hospitals.—People affected by cholera, or plague, are sent to the hospital on Aliyah island; if by small-pox to the hospital for that disease at Maalla; and those suffering from other infectious diseases are placed at such hospitals in Aden as the health officer of the port may determine in each case. The hospital, reported to be a very inefficient establishment, admits officers at the rate of 3 rupees per diem and sailors at 1½ rupees. The Institute charges one rupee per diem for all.

Population.—The population of Aden in 1891 was 34,860, but it has been kept smaller owing to the establishment of the village of Sheikh Othman on the mainland.

Climate.—The climate of Aden is not insalubrious, and though very hot during the South-west monsoon, is not so intensely hot as that of the Red sea. Heat apoplexy is common during the hot season amongst the mercantile marine, especially amongst the firemen. During the cool season, chills are especially to be avoided; see also pages 26 and 27.

Supplies, Repairs, &c.—Provisions of every description are procurable from the stores in Aden harbour; fruit and vegetables are scarce; ice can be obtained. Distilled water may be purchased at about

See plan, No. 7.

8s. 4d. per ton. There is no factory capable of doing very heavy work, but repairs both to hull and machinery may be effected by the firm of Luke Thomas and Co.; castings up to $1\frac{1}{2}$ tons can be made. There are no piers or wharves for ships. There is a floating dock that will take a vessel of 750 tons, if not over 185 feet long; and a patent slip 75 feet in length for small craft and launches only.

Coal.—From 30,000 to 35,000 tons of coal are usually in stock at Aden, all of which belongs to the large steam ship companies; the price in 1898 was 33s. 9d. per ton. There are great facilities for coaling in the Inner harbour and no interruptions; but at times, especially during the South-west monsoon, from about 1st June to 15th September, delays occur when coaling in the Outer harbour. Coaling is effected by means of lighters, no wharf being available.

Winds and weather.—See Appendix, page 483.

ADEN WEST BAY.—Bander Tauwahi, or Aden West bay, is formed by the peninsulas of Jebel Ihsan and Jebel Shumshum. It is about 8 miles wide from east to west, by 4 miles deep, and is divided into two bays by a flat, which extends about 7 cables south-south-westward of Aliyah island.

For administrative purposes the bay is divided into an Outer and Inner harbour, of which the limits are thus officially described:—The Outer harbour includes all that space between the southern limit and a line drawn from the centre of Ras Marbut fort through the inner light-vessel to the opposite coast. The Inner harbour includes all that space to the north-eastward of and within a line drawn from the centre of Ras Marbut fort through the light-vessel to the opposite coast.

The depth of water in the centre of the Outer harbour, is 4 to 5 fathoms, decreasing gradually towards the shore; across the entrance, between Ras Tarshein and the Ass's Ears, the depths are from $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms, and at 2 miles outside from 8 to 10 fathoms; the bottom, in all parts, sand and mud.

LIGHT-VESSELS.—Marbut shoal.—A light-vessel, painted red, and carrying a red ball at the masthead, is moored off Ras Marbut in a depth of 22 feet at low water springs, on the south-west side of Marbut shoal, with the signal staff (333 feet) bearing E. $\frac{1}{4}$ S., distant $5\frac{3}{4}$ cables. The light-vessel exhibits *two red* lights, placed vertically 8 feet apart, (the lower elevated 20 feet above the sea), visible in clear weather from a distance of 8 miles.

Another light-vessel is moored N.E. by N. $3\frac{1}{10}$ cables from the above, on the southern side of entrance to the Inner harbour, in 18 feet water, from which is exhibited at 39 feet above the sea, a *flushing white* light,

See plan, No. 7.

showing a *flash every minute*, visible in clear weather at a distance of 10 miles. This vessel is also painted red; at night, on a vessel entering, a gun is fired therefrom.

The wreck of the steamship *Anadyr*, sunk in the Outer harbour, lying W. $\frac{1}{4}$ S. 9 cables from the inner light-vessel, and from Ras Tarsheiu N.W. $\frac{2}{3}$ W., is marked by a vessel exhibiting the usual wreck marking signals, night and day. The vessel is painted green, with the word *Wreck* in white letters on her topsides. Vessels entering or leaving the Inner harbour should pass southward of the light-boat.

For the light on Ras Marshag, *see* page 353.

Light-buoys.—Four light-buoys mark the channel into the Inner harbour, one of which, painted red, and showing a *fixed red* light is on the southern bank about a mile north-eastward of the inner light-vessel; and three, painted black, showing *fixed green* lights, are on the northern side of the channel on the edge of the bank.

Buoyage.—The buoys marking the approaches and channel to Aden anchorage are painted in accordance with the system of buoyage adopted in India, that is, starboard-hand buoys entering from seaward, are red, conical; port-hand buoys, black, can.

Tides.—The tides in the bay are very irregular, being influenced by the currents outside. It is high water, full and change, at 7 h. 54 m.; springs rise 7 feet, neaps 4 $\frac{1}{2}$ feet, approximate. The tides are subject to a large diurnal inequality, which may increase or diminish the rise by one foot or more. About the time of the moon's quarters there is frequently only one high and one low water in the 24 hours.

Tide Signals.—On the approach of a vessel to the harbour, a signal is shown at the mast-head of the inner light vessel, indicating the depth of water in the channel; the following signals denote also whether the tide is rising or falling:—

Letter C, Commercial Code, at the ensign staff denotes flood tide; letter F, at the ensign staff, denotes ebb tide.

At high, and also at low water, the pendants are hoisted below the flags at the mast-head, showing the depth of water in the channel.

Pilots.—Merchant vessels entering the Inner harbour are obliged to take pilots. A man-of-war will, on entering, be shown her berth by an official from the harbour master's department.

Pilotage Regulations.—No vessel exceeding 100 tons burden is permitted to enter or leave the Inner harbour without the permission of the Conservator of the port. All vessels arriving off the port, and wishing to enter the Inner harbour, must fly the pilot jack at the fore and remain

See plan, No. 7.

in the Outer harbour until boarded by the pilot. A pilot approaching a steam-vessel entering at night will flash a bull's-eye lamp at frequent intervals.

No fee is charged for the pilotage, by day, of a vessel out of the Inner harbour. In no other case is the fee for the pilotage of any vessel within the limits of the Port of Aden less than 10 rupees. Fees in excess of 10 rupees are calculated per 100 tons, or part thereof, of the vessel piloted, as follows, viz.:—Into Inner harbour by day, 2 rupees; by night, 3 rupees; out of Inner harbour by night, one rupee. Taking a vessel to or from her anchorage in the Outer harbour by day, one rupee; to her anchorage in the Outer harbour by night, $1\frac{1}{2}$ rupees; out of the Outer harbour by night, one rupee. Taking a steamer or square-rigged vessel alongside another vessel in the port, or moving a vessel from one place to another, one rupee per 100 tons, in addition to any other pilotage fees.

When a pilot is detained on board a ship for more than one hour after his arrival, by reason of the vessel not being ready to proceed, a charge is made of 10 rupees.

Outer Harbour.—There is anchorage in the Outer harbour in Aden West bay for heavy draught ships in 6 fathoms, with the outer light-vessel bearing N. by E. $\frac{1}{2}$ E. and Round island E.S.E. Vessels may anchor in 4 fathoms, about half a mile westward of the light-vessels. A ground swell at times rolls into this bay during the South-west monsoon.

Inner Harbour.—Depths.—Aden Inner harbour, as before described, lies eastward of the inner light-vessel, and includes the inner bay. A dredged channel leads from the Outer to the Inner harbour, in which the depth is not less than 24 to 26 feet at low water spring tides. This channel passes westward of the two light-vessels, and thence merges into the harbour proper, which lies almost parallel to the Aden shore from Ras Marbut to Ras bin Jarbein, at the distance of about $2\frac{1}{4}$ cables; in this part of the harbour the depth is from 26 to 28 feet. The channel is generally about a cable in width, but narrows to half a cable near the inner light-vessel; from Ras Marbut the harbour with the above depths is one to 2 cables wide. Northward of these limits, and also between them and the Aden shore, the water quickly shoals to 15 or 16 feet.

The Flint rock, or Sheikh Ahmad island, lies just southward of the deep water, and has a very narrow 2-fathoms channel between it and the Aden shore. The edges of the shoal water are marked by four light-buoys, already described, and there are several mooring buoys laid down in the best water. Westward of Flint rock, vessels of 23 to 26 feet draught can lie afloat at low water; between Flint rock and Ras Hujaf the depth in the anchorage is from 16 to 20 feet.

See plan, No. 7.

Eastward of Ras Hujaf is the Inner bay, its entrance being between that Ras and the sand-spit extending southward from Aliyah island; at low water it is about 3 cables across. Off Ras Hujaf is the Jeramah rock, marked by a beacon; the depths across the entrance, and in the central part of the bay, are from 2 to $2\frac{1}{2}$ fathoms decreasing towards the shore. This inner bay is used solely by native craft.

There are several islands in the Inner bay:—the eastern and principal one, Jezirat Sawayih, is 300 feet high and almost joined to the mainland at low water, springs; the others are, Marzúk Kebir, Kais-el-Hamman, Kalfetein, and Feringi; and, on the sandspit forming the northern side of entrance to this bay are the two small islets Jam Ali, and Aliyah.

On the shore between Ras Marbut and Ras Hujaf are several piers, the local telegraph and post offices, coal depôts, and the military establishments near Ras Marbut or Steamer point. The clock tower, of red brown stone, on the hill (165 feet) near Ras bin Jarbein is very conspicuous, and can be seen about 19 miles. There is also a conspicuous white mosque near the Prince of Wales' pier.

The Observation spot on Ras Marbut is in lat. $12^{\circ} 47' 11''$ N., long. $44^{\circ} 58' 31''$ E., and the local telegraph office in lat. $12^{\circ} 47' 16''$ N., long. $44^{\circ} 59' 7''$ E.

Quarantine ground.—The quarantine ground for sea-going vessels is that portion of the outer harbour lying to the northward of a line from Aliyah island through the wreck *Anadyr*; and west of a line drawn S. $\frac{1}{4}$ W. from the wreck, until it meets a line running E. $\frac{1}{4}$ N. from Jezirat Salil.

Directions.—The shore of Aden peninsula is bold to approach, and a vessel may choose her own distance. Those from the westward may steer direct for the light-vessels, passing westward of them and rounding the northernmost, which lies at the entrance of the Inner harbour; tide signals are shown from the inner light-vessel. Vessels from the eastward have the advantage of Marshag light, and should pass about one mile southward of it, to clear Ras Sinaila and Round island; then, after passing Ras Tarshein at about 3 cables, they may steer to pass the light-vessels, as before. A vessel working into the bay, towards the anchorage, may stand boldly across in any direction, being guided by the lead, until the light-vessels are reached, northward of which the depth becomes less, and short tacks must be made. It is advisable always to moor in Aden Inner harbour, the anchorage being rather confined; and good scope of cable should be given, in consequence of the sand squalls from the northward and eastward after sultry weather, which squalls give but little warning.

At night, vessels entering Aden harbour from the eastward, should not shoal under 6 fathoms (low water springs-) until the *white flashing* light

of the inner light-vessel is well open westward of the *red fixed* light of the Marbut shoal light-vessel; when they may haul in for any point between those lights and the *Anadyr* wreck-marking lights, and round the inner light-vessel at the distance of half a cable, in not less than 26 feet water.

RAS MARSHAG, 2 miles eastward of Ras Sinaila, is a narrow projecting cape forming the south-eastern point of Aden promontory, and affording shelter to the anchorage of Bander Daras, which lies between it and Ras Taih.

Between Ras Marshag and the island of Sirah the curve of the land forms Bander Hokat, a small sandy bay; and, northward of the island, between its northern point and Ras Kútam, is another small bay, close to the town of Aden.

LIGHT.—A *fixed white* light, of the first order, is exhibited from a dark gray lighthouse 85 feet high, on Ras Marshag. The light is elevated 244 feet above high water, and is visible in clear weather at a distance of 20 miles; it is chiefly of use to vessels making Aden from the eastward. Westward of Aden, it is not visible until it opens southward of Ras Taih. There is a signal station on the ridge north-westward of the lighthouse.

Aden East bay.—Anchorage.—The depths in Aden East bay, north-eastward of the town, are regular, so that a vessel may choose her own position in from 5 to 10 fathoms. During the North-east monsoon a heavy swell rolls in; but, from June to August, with the wind from the westward, good anchorage and smooth water may always be found under the island. During these months, if wishing merely to communicate with the authorities, this anchorage may be found convenient, being near the town. The hot dry gusts blowing from over the hills are usually strong and disagreeable.

THE COAST from Aden eastward.—Great Britain possesses the territory of Aden, and exercises a protectorate over the greater part of the Southern coast of Arabia. By treaties concluded in 1888, and since, the Fadthli, Aulaki, Wahidi, the Jamada of Makalla and Shuhair, and other tribes along the Southern coast of the Sultan of Maskat's dominions, placed themselves under the protection of the British Government. The Khorya Morya islands were ceded to Great Britain by the Sultan of Maskat in 1854.

The description of the Arabian coast, eastward from Aden, is continued in Chapter XI. at page 416.

See plan, No. 7.

CHAPTER IX.
STRAIT OF BAB-EL-MANDEB TO RAS AL HAMAR,
SOMÁLI COAST.

(Lat. $12^{\circ} 25'$ N. to lat. $10^{\circ} 20'$ N.; long. $42^{\circ} 33'$ E. to long. $49^{\circ} 22'$ E.)

VARIATION IN 1900.

Gulf of Tajura	-	$3^{\circ} 20'$ W.		Berbera	-	$3^{\circ} 0'$ W.
Burnt island	-	$2^{\circ} 40'$ W.				

IN this chapter, the description of the African coast, or western and southern shores of the gulf of Aden, is continued from the point at which it had arrived at page 237, chap. V. The strait of Bab-el-Mandeb, with Perim island, the Brothers, and Ras Siyan, are all fully described in the concluding pages of that chapter; we, therefore, now proceed with the description of the coast southward from Ras Siyan.

The Coast.—From Ras Siyan, the coast trends S. by E. $\frac{1}{4}$ E. 16 miles, and then S. $\frac{1}{4}$ W. 15 miles to Ras al Bir. In the first portion, it is low, sandy, covered with jungle, and fronted by a rocky reef extending from half to three quarters of a mile. The depths are regular, increasing gradually from the shore, the 20-fathoms line being distant about 3 miles, and the 100-fathoms line about 8 miles. There are two creeks at 4 and 6 miles southward of Ras Siyan. Khor Angar, the southernmost, has a small islet close northward of it.

JEBEL JAN is the highest of three or four ranges of table mountains, which reach a great height, and approach close to the sea. It is about 13 miles southward of Ras Siyan and 18 miles northward of Ras al Bir.

There is anchorage off Jebel Jan, and, though quite exposed, and no better than others along the coast, it has the advantage of the foreshore being free from reef.

Southward of the high land of Jebel Jan, the coast again becomes low and sandy, until within about 5 miles of Ras al Bir, when it commences to rise towards that point. Between the shore and the mountains is an

See charts, Nos. 8e and 253.

extensive plain covered with mangrove bushes and brushwood. Fronting the low sandy shore at from 5 to 15 miles northward of Ras al Bir, are shallows extending a long way out, and which at one part are reported to dry at half-tide for nearly 3 miles off-shore; this is further seaward than shown on the charts, and vessels should give that part of the coast a good berth in passing. About one mile outside the part which dries there are 8 fathoms water, from which depth the soundings increase regularly but rapidly to from 80 to 100 fathoms at 7 miles off-shore. The light on Ras al Bir is obscured over all this dangerous shallow ground and for probably about half a mile outside its south-eastern limit.

RAS AL BIR, the northern point of entrance to the gulf of Tajura, is a cliffy point from 70 to 100 feet high. From its pale colour it would be difficult to distinguish at night but for the light. It is, however, almost steep-to, the reef fringing it being only half a cable wide; there is no bottom at 30 fathoms half a mile off the Ras, and at about a mile there are from 70 to 80 fathoms.

LIGHT.—At 365 yards within the extreme of Ras al Bir is exhibited from a square grey lighthouse, 39 feet high, and at 157 feet above the sea, a *fixed white* light, visible in clear weather at a distance of 15 miles. The light is visible seaward between the bearings S. 29° W. and N. 78° E. This is an experimental light.

GULF OF TAJURA.—From Ras al Bir, the gulf of Tajura, including the remarkable Ghubbet Kharab at its head, recedes 55 miles in a W.S.W. direction. Its southern point of entrance is Ras Jibuti, which is only 38 miles from the head, and this point bears from Ras al Bir, S.W. by S. 25 miles; the Mashah islands with their dangerous coral reefs lie off Ras Jibuti towards the middle of the gulf on this line of bearing. The whole gulf, including these islands, is under the protectorate of France.

The central depth of water throughout the gulf is generally very great. It is also as a rule deeper and clearer of dangers on the northern shore than on the southern; anchorages here are scarce, and do not afford much security. The coasts all round the gulf are, with rare exceptions, high, and at a short distance inland, mountainous.

The only villages or settlements on the whole extent of the northern shore of the gulf are, Obokh, Tajura, Ambabu, and Sagallo; scattered parties of the Danakeli tribe may occasionally be seen, when pasture being scarce in the interior, they drive their flocks down to the coast, but they have no villages. On the southern shore of the gulf there are neither towns, villages, nor settlement, except at Jibuti, where the French have a station and Resident.

Inhabitants.—From the entrance of the Red sea to Ghubbet Kharab, the inhabitants are of the Donakil or Danakeli tribe, whose territory extends inland to the borders of the kingdom of Shoa. They probably exceed 5,000 in number, and are subdivided into several smaller tribes, viz. : the Abd-Ali, the principal, to which the Sultan belongs ; the Abli ; the Debenk ; and the Rukbeh. Their religion is Mahomedan, but they are not strict observers of their creed. They are all armed with spears, shields, and crises ; some few have swords, and near the coast a few have firearms. Opinion seems to be divided as to the character of these people ; by their neighbours they are held in great disrepute, being considered cruel, treacherous, and inhospitable, in the same manner as they themselves hold the Esa-Somális to be murderous thieves. Europeans who have visited the coast have generally been received with great civility, possibly owing to their being armed ; but the probability is, that if treated kindly and their prejudices respected, they in return will act civilly.

From Ghubbet Kharab eastward as far as Kulangárit, 24 miles beyond Zeila, the coast is inhabited by wandering parties of the Esa-Somális, a powerful tribe said to be much feared by the Danakels inhabiting the opposite side of the gulf. They are, generally speaking, a tall race, the men averaging 6 feet in height. They are rich in cattle ; bullocks, sheep, and goats are cheap, and their camels are large. Their sea-coast is barren, but the interior is said to be very fertile. The produce of their country is brought to Zeila, where it is exchanged for coarse white and blue cloth, tobacco, &c.

OBOKH is a French settlement about 4 miles westward of Ras al Bir. The place, which only had about 30 inhabitants when the French took possession in 1884, numbered from 700 to 800 in 1887, composed of Somális, Arabs, Abyssinians, and Danakels. Caravans were organised to open up trade with Shoa and other places in the interior, but Obokh is now little used as a port, and the trade has declined since the development of Jibuti.

The detachment of French troops is quartered on cape Obokh, which is a healthy position to windward of the marshes ; here there is also a small battery, flagstaff, and signal station with which ships can communicate by the International code. An iron pier runs off 400 yards in an easterly direction from cape Obokh, to the edge of the reef ; and a pier about the same length projects to the edge of low water in the north-west corner of the South port.

The Obokh river runs into the harbour on the north-eastern side of the settlement ; it is an inconsiderable stream and dries up in the summer months.

The country is not unhealthy, and the temperature is supportable during the winter season. At all times it is advisable to use precautions against the sun.

Communications.—Obokh is in telegraphic communication with Perim, by telegraph cable, and thus with the general system; it is also connected by cable with Jibuti. Mail steamers call, but there is no information as to the frequency of communication by this means.

Coal and Supplies.—A supply of coal, exceeding 500 tons is kept at Obokh; about 200 tons can be put on board per diem by lighters, under favourable circumstances. Strong southerly winds, which blow at times, interrupt coaling. Water from the wells is only suitable for washing purposes. The condenser for supplying water to the Europeans is capable of making 20 tons a day. Beef of inferior quality is obtainable, sheep of fairly good quality can be procured, and a few vegetables are grown by the troops.

The HARBOUR of Obokh is formed by the bight in the coast just eastward of cape Obokh, and is protected by outlying, detached, and very shallow reefs, extending from one to $1\frac{1}{2}$ miles off-shore. The shape and position of these reefs causes a division into two parts of the space available for anchorage, which parts are called the South and North-east ports.

South port affords anchorage in from 6 to 17 fathoms for four or five vessels; it is protected from all winds except those from the south-westward, from which quarter very strong winds blow at times, rendering the port dangerous. With local assistance vessels might shift berth to the North-east port on the approach of bad weather, there being a straight but narrow channel connecting the two ports with from 8 to 10 fathoms water; *see* directions. The South port is conveniently near the settlement, and small vessels may beach on the north-western side of the port.

Depths.—The entrance is between the eastern extreme of the Laclocheterie bank, marked by a buoy, and the western extreme of the Surcouf bank; it is about 3 cables wide, with a mid-channel depth of from 34 to 26 fathoms.

North-east port is but little used, being difficult of access; it has, however, a larger space available for anchorage than South port and more convenient depths of water, from 5 to 8 fathoms. Its former direct entrance, called the East passage, between the north-eastern end of the Surcouf reef and the Curieux banks extending from the shore, being considered dangerous is no longer buoyed, and vessels using North-east port must proceed to it through the South port.

See plan, No. 919.

Banks and Buoys.—The three great banks forming and protecting the harbour are the Surcouf, Curieux, and Laclocheterie banks.

Surcouf bank, the middle bank, is $1\frac{1}{4}$ miles in length, and from 3 to 5 cables in width, with a coral bank, dry at very low springs, about $4\frac{3}{4}$ cables in extent, near its western end; the remainder has from one foot to 3 fathoms, coral.

Curieux banks stretch off half a mile from the north-eastern point of the bay, leaving the East passage, before described, between them and the Surcouf bank.

Laclocheterie bank extends about 6 cables eastward of cape Obokh, with portions of it dry at very low springs. Between it and the Surcouf bank is the main channel into the South port.

A red conical buoy marks its eastern extreme.

Bisson bank is a continuation of the shore reef lying between South port and North-east port, and projecting out in the centre to the distance of 6 cables from the mainland. Its outer part dries in places at very low springs, and is marked at its extreme southern point by a black conical buoy.

Pearl bank, with a least depth of $2\frac{1}{2}$ fathoms, occupies the greater part of the space between the western portions of Surcouf and Bisson banks; its south-west extremity is marked by a white conical buoy, and defines the north-east limit of the South port.

The passage into North-east port, less than half a cable in width in its narrowest part, lies southward of Pearl bank, and of Middle bank farther eastward, upon which the minimum depth is $1\frac{3}{4}$ fathoms.

Too much dependence must not be placed on the buoys being in position.

Beacons.—A white stone pile (D) is erected on the hill 62 feet high, at the head of the harbour, and a white stone pyramid beacon (C) on the coast eastward of Buret bay; these beacons are not easily seen.

Tides.—It is high water, full and change, at from 7h. to 9h. 30m.; springs rise about $8\frac{1}{4}$ feet. There is considerable diurnal inequality, chiefly affecting low water of neap tides.

Winds and Weather.—During the North-east monsoon, from October to April, the wind at Obokh blows from E.S.E. to E.N.E. with variable force, which appears to be influenced by the phases of the moon. The breeze freshens in hauling to E.N.E. and slackens when blowing more from the southward. It is generally calm during the months of May and September. The South-west monsoon makes itself felt from June to August, sometimes with violence, but always in an intermittent manner. The Khamsin is a North wind, dry, scorching, and loaded with sand, which springs up suddenly, especially in these months, and it sometimes

See plan, No. 919.

blows with very great violence. The South-west wind prevails generally in the morning, and the Khamsin rises suddenly in the afternoon and lasts to the middle of the night. Sometimes it continues during the night, diminishing in force and resuming greater strength towards 7 or 8 a.m., blowing in this manner for three or four consecutive days; it has been known (June 1892) to last for 7 days without interruption. During this wind the thermometer on shore frequently rises to 113° Fahrenheit. In July 1884 H.M.S. *Ranger* experienced this wind, and found the thermometer, which had been 89° at noon, rise to 100° , with the wet bulb at 75° .

DIRECTIONS.—South port.—A vessel coming from the north-eastward, and having passed Ras al Bir, must shape course to pass southward of the Surcouf bank. The white house on the ridge, the flagstaff, and the buildings on cape Obokh, serve to identify the place. When cape Obokh bears W.N.W., steer for it until the square tower of the prison is open a little westward of the slaughter-house on the beach, bearing N. by W. $\frac{5}{8}$ W., which leads to the anchorage, and about midway between the Laclocheterie and Surcouf banks.

Now that the lights at this port have been discontinued, it should not be entered at night. There are no pilots.

Anchorage.—Vessels may anchor, in 14 fathoms, on the entering line of bearing with Government house on cape Obokh bearing about W. $\frac{3}{4}$ S., or somewhat nearer the cape in 9 fathoms; the holding ground is very good, stiff mud.

From South port to North-east port.—From abreast of the Laclocheterie bank buoy, beacon C on the cliff eastward of Buret bay bears N.E. by E. $\frac{3}{8}$ E., and steered for on this bearing leads midway between the Pearl and Surcouf banks. When through the narrow passage, haul gradually to the northward round the Middle bank, which is easily distinguished, to bring the white pile D to bear N.W. by W., when steer N.W. to the anchorage, where the depth is 7 fathoms at 2 cables from the north shore.

Ras Dúan is an abrupt precipitous cliff, about 400 feet in height; it bears S.W. by W. $\frac{3}{4}$ W. 21 miles from Ras al Bir, and is at the eastern extreme of Mersa Dúan; it is surrounded by shoal water for about half a mile, and at that distance eastward of it the French man-of-war *Météore* touched in 10 feet. From the edge of the shoal water the soundings deepen suddenly, there being from 24 to 49 fathoms a short distance from it, and 120 fathoms at $1\frac{1}{2}$ miles southward of the Ras. Between the shoals off Obokh and Ras Dúan, there are no outlying dangers, except a patch of $1\frac{1}{2}$ fathoms, three-quarters of a mile off-shore, and 4 miles eastward of the latter; but from Latela, which is 3 miles west of Obokh, to Arkailé 6 miles

farther westward, shallow water extends from half a mile to one mile from the shore. The coast between Obokh and Ras Dúan recedes 4 miles, forming a bay, of which the shore for nearly the whole distance to Ras Dúan is a precipitous cliff, the mountains approaching close to the sea; these mountains are thickly clothed with trees, and the valleys appear to be fertile.

Anchorage, with good shelter in off-shore winds, may be had in this bay in about 12 to 16 fathoms, excellent holding ground, one mile from the shore and about 3 to 5 miles westward of Obokh. Native vessels make use of this anchorage.

There is also anchorage at Dallai, southward of the reef of Mido point, where there is landing on the beach; and at Yaia cove, $1\frac{1}{2}$ miles north-eastward of Ras Dúan.

Mersa Dúan.—Between Ras Dúan and Ras Ali, a distance of $6\frac{1}{2}$ miles in a W. by S. $\frac{1}{2}$ S. direction, the coast forms a shallow bay which is fronted in its western half by a reef extending nearly $3\frac{1}{2}$ cables from the shore. Mersa Dúan is a gap in this reef affording good anchorage and shelter for small craft during the South-west monsoon, it being protected by the reef projecting from Ras Ali, which is dry in some parts at low water. The depths at this place are from $3\frac{1}{3}$ to 15 fathoms, increasing very rapidly to 65 fathoms at one mile from the bank. It is not a good anchorage during the North-east monsoon or when easterly winds prevail. In the eastern part of the bay, immediately at the base of the table-topped cliffs forming Dúan bluff, and distant from the beach three-quarters of a mile, are three wells; two of them are cold springs of excellent water, the other is a hot spring, of a temperature of about 100° Fahrenheit. There is a well-worn path between this bay and the village of Tajura, about 7 miles distant to the westward.

The coast between Ras Ali and Tajura, a distance of $3\frac{1}{2}$ miles, is rocky, precipitous, and steep-to, though at one mile eastward of Tajura there is a small projecting shore reef, immediately outside of which there is no bottom at 76 fathoms. The coast in this neighbourhood rises gradually towards the mountains in the interior.

Khor Ras Ali, a narrow inlet three-quarters of a mile in length, is situated close westward of Ras Ali; it has from 6 to 7 fathoms water, with a mud bottom, and affords shelter for small craft from all winds: there is, however, a rocky bar across its entrance, with only 9 feet at high water. During the South-west monsoon this anchorage is made use of by native craft.

TAJURA, the seaport of the Danakeli tribe, is a village consisting of about 200 huts, and containing about 1,000 inhabitants; the chief of the tribe, who bears the title of Sultan, resides here. It is built close to

the sandy beach, and, at the extremes of the village are two coral-built white houses; the western house is used as a mosque. At the back of the village on the height is a rude fort, at which the French flag is hoisted. There is very little trade here now, that which formerly existed having been diverted to Jibuti.

Water.—Very good water is obtainable from wells sunk about 10 feet deep.

The Harbour is merely an indentation in the shore reef, which extends about $2\frac{1}{2}$ cables off-shore, immediately outside of which there is no bottom at 40 fathoms. It is of horse-shoe shape with an entrance one cable wide, having from 10 to 14 fathoms water, but with barely room for a vessel to swing. It is only during the North-east monsoon that native craft can lie in the harbour; during the South-west monsoon it is extremely dangerous.

The anchorage off Tajura is in 14 fathoms, with the remarkable house westward of the town bearing N. $\frac{1}{2}$ E., and the isolated house eastward of the town E. by N. $\frac{1}{4}$ N. The anchorage is not at all good.

The Coast.—From Tajura to the entrance of the Ghubbet Kharab, a distance of 18 miles in a south-westerly direction, the shore is bold, there being from 10 to 15 fathoms close in, and, immediately outside, from 30 to 40 fathoms. In the neighbourhood of Tajura, and for 9 miles to the westward, the mountains recede about 3 miles from the coast, but from thence westward they approach close to the sea. Jebel Gudelh, 5,459 feet high, is a table mountain, and the highest part of this range. The mountains are thickly covered with trees, those on the summits appearing to be very large.

Ambabu, where good fresh water may be procured, is a small village consisting of about 10 huts, situated in a grove of trees in a bight of the coast 4 miles south-westward of Tajura. The Danakels inhabiting this village possess numerous herds of cattle and sheep. There is fairly good anchorage in from 12 to 14 fathoms, mud, in fine weather or with off-shore winds, with the village bearing N.N.W., and there are from 3 to 4 fathoms close to the beach; the water deepens quickly to seaward.

Point des Palmiers, 6 miles south-westward of Ambabu, is a slightly projecting point of land upon which there is a cluster of palm trees close to the sea. About three-quarters of a mile inland is Mont du Sphinx, standing detached.

The village of Sagallo is 7 miles south-westward of Ambabu, and about the same distance from the entrance to the Ghubbet Kharab; it is in ruins and completely abandoned, but the natives bring their flocks to this neighbourhood to graze when pasturage becomes scarce in the interior.

GHUBBET KHARAB, at the head of the gulf of Tajura, is an extensive basin of irregular shape, 11 miles in length N.W. by W. and S.E. by E., by about 5 miles in breadth. The northern and southern shores consist of precipitous limestone cliffs, from 400 to 2,000 feet above the level of the sea, in which are deep ravines. In these ravines are large masses of rock, and trees of considerable size torn up by the roots, lying in the direction of the ravine, and evidently borne down by mountain torrents. The whole of the western shore is volcanic, and the valley is strewn with lava and volcanic remains; the lava extends 2 or 3 miles inland to the foot of a range of sand-hills rising 200 or 300 feet above the plain. From the summit of these hills, Bahr Assal or Salt lake, said to supply all Abyssinia with salt, is visible 5 or 6 miles to the north-westward.

Entrance. — Depths. — The entrance to Ghubbet Kharab is $4\frac{1}{2}$ cables wide, and divided into two channels by a rocky islet about 36 feet high, named Pass islet. The southern channel of from one to $2\frac{1}{2}$ fathoms is nearly $2\frac{1}{2}$ cables wide, over a rocky bottom, and is only practicable by boats or small vessels drawing less than 6 feet, and then only at slack water, as with any wind and tide a large wave is produced in the middle of the channel which boats cannot cross without risk of foundering.

The northern channel is about 170 yards wide between steep banks, with depths of from 14 to 18 fathoms. The tides rush through these channels with great rapidity, causing whirls and rippings, giving the place a dangerous appearance; and in the North channel, the only one practicable for ships, at times attain a rate of 7 knots. The passage through should, when feasible, be made at or about slack water, which, however, is usually of but short duration, lasting only a few minutes.

There is a flagstaff on the North entrance point, and about a mile to the northward of it, a hill with a remarkable tree on its summit. Just northward of the entrance are some ruins, and below high water mark is a hot spring; at high water there is no sign of it.

The depth in the centre of Ghubbet Kharab is 105 fathoms, and the cliffs on either side are steep-to, affording no anchorage for a vessel. It is a remarkable fact that the mud brought up by the lead, even at a depth of 105 fathoms—after scraping off the outer coating—is perfectly fresh to the taste, notwithstanding that the water at the surface is so exceedingly salt as to be painful to the eyes when used for bathing purposes.

At the western extreme is a small basin about 150 yards in diameter, surrounded by precipitous volcanic cliffs, and having 15 fathoms water. The entrance is completely closed at low water by a ridge of rocks; the water is always running from it, even during flood tide; the natives have

See chart, No. 253.

an idea that it is connected subterraneously with the Bhar Assai, but of this no signs are apparent, nor is the water at all agitated.

On the western side, also, is Bud Ali, a precipitous, inaccessible island 545 feet high, of a reddish white appearance; N.W. of it is Little Bud Ali, 262 feet high, entirely volcanic, the course of the lava being plainly perceptible down its sides. On the mainland, close to Bud Ali, is the mouth of an exhausted crater, about 300 feet in diameter and apparently 300 feet deep.

Besides these islands are two others, Parrot island or Had Ali, on the southern shore; the other, a mere dry rock on the northern or Danakeli side, having a narrow channel between it and the shore with 10 fathoms water, mud bottom.

Etoile anchorage.—Etoile bay, situated on the northern shore of Ghubbet Kharab $1\frac{1}{2}$ miles within the entrance, is about $1\frac{1}{2}$ miles deep in a N.W. by W. direction, and from 2 to 3 cables wide, and has depths of from 11 to 17 fathoms, sand and mud; an island and some sunken rocks lie on the north shore at the entrance. This is the best anchorage in the Ghubbet, and is of sufficient capacity to afford very good shelter to large ships from all winds. In entering keep towards the southern shore to avoid the rocks and shoal ground westward of the island; give Etoile point a berth of $1\frac{1}{2}$ cables when rounding it.

Salt Lake anchorage, at the north-west extremity of the Ghubbet, is open and exposed to easterly winds; but otherwise there is good anchorage in 7 fathoms, sand and mud, at $2\frac{1}{2}$ cables from the south shore.

Bud Ali anchorages.—A vessel may take anchorage westward of the centre of Bud Ali in 16 fathoms at about $1\frac{1}{2}$ cables from the shore, from which the reef projects half a cable; here there is protection from easterly winds, but the anchorage space is very limited.

There is also limited anchorage in the small bay, 6 cables deep and about $1\frac{1}{2}$ cables wide, lying northward of Little Bud Ali, in from 8 to 12 fathoms; this anchorage is open to winds between E. by N. and S.E.

Tides.—In Ghubbet Kharab the tide is about an hour later than in the Gulf of Tajura, varying, at high water full and change, between 8 h. and 10 h. 30 m.; the rise is about 6 feet. The day tide is the stronger.

Temperature.—The heat in Ghubbet Kharab during the hot season, May to October, is excessive, when temperatures of 104° to 113° Fahrenheit are not rare; from November to April it ranges from 73° to 84° .

The Coast.—From the entrance to Ghubbet Kharab, the southern coast of the Gulf of Tajura trends in a general easterly direction to Ras Jibuti. There is a moderately good anchorage immediately outside

See anchorages on plan, No. 2,090.

Ghubbet Kharab in 15 to 17 fathoms, mud, 3 cables from the shore and protected from easterly winds by the rocky islet of Boutres, separated from the mainland, and extending half a mile from the shore. The only other anchorages of the least importance on this shore are at Eiro, Khor Ambada, and Jibuti.

The whole southern coast as far as Manga Daffa, 5 miles westward of Ras Jibuti, is bold and precipitous, the mountains approaching closely to the sea, and the cliffs lining the shore of 100 or 200 feet, soon rising to a height of 400 or 500 feet. From Manga Daffa eastward the shore becomes low and swampy.

Eiro anchorage, $9\frac{1}{2}$ miles eastward of Ghubbet Kharab, is a small bay just westward of Ras Eiro, where shelter may be found from easterly winds in 12 fathoms, close to the cliffs; this shelter, though the holding-ground is indifferent, may prove of value, as in the whole length of coast from Boutres anchorage outside Ghubbet Kharab to Khor Ambada, a distance of 18 miles, there are, except at this one spot and perhaps some other trifling exceptions, from 20 to 50 fathoms water close in to the cliffs.

KHOR AMBADA is a small inlet on the southern side of the gulf about 7 miles westward of Jibuti; it is a narrow and deep opening through the dark volcanic lava cliffs, forming the bed of the river Ambada, which is dry at the lowest tides, and into the head of which runs a stream of fresh water. There is very good anchorage in from 12 to 15 fathoms off it, formed by a reef running out 4 cables at right angles to the shore on the western side of the anchorage; by other shoals extending 6 cables from the shore on the eastern side, affording protection from easterly winds; and, by a shoal patch of from 6 feet to 3 fathoms nearly 4 cables in extent on the northern side of the anchorage between the other two reefs, leaving an entrance to the anchorage on either side of it. Around these patches and towards the shore are from 12 to 14 and 17 fathoms water, sandy bottom.

The entrance eastward of the central shoal is about 3 cables wide the western entrance is about $2\frac{1}{2}$ cables. There are two white triangular marks on the shore, which are useful guides in steering for the anchorage; the first is half way between Black rock and Observation point, the second on the southern shore of the channel of the river southward of Observation point. A bearing of the first, S. 30° W., gives a good leading line for the N.E. channel, and of the second, S. 47° E., for the N.W. channel.

Anchorage.—The best anchorage is about 2 cables northward of the first triangular mark in from 12 to 14 fathoms, sand and mud. Here there is good shelter in both monsoons, and boats are always able to pass between the ship and shore. Communications by signal with craft in the river can also be made from here, the Khor being open in this direction.

See chart, No. 253, with plan of Khor Ambada.

Water.—The springs supplying the stream at the head of the inlet are covered at high water; the spot is accessible to boats at half tide; and, in order to ensure the freshness of the water the supply should be taken in on the flood. There are two small lakes a short distance inland from this spot; the water is drinkable, but cannot be kept on account of the quantity of decaying vegetable matter which it holds in suspension. In the event of a vessel watering at Ambada, it is prudent to have the party armed.*

Ras Jibuti bears East $8\frac{1}{2}$ miles from the entrance to Khor Ambada, and N.W. $\frac{1}{2}$ W. 22 miles from Zeila anchorage, and is the southern point of entrance to the gulf of Tajura. It is a low rocky point, portions of which are at times overflowed by the tide, projecting about 2 miles northward from the coast, close off which is a flat coral island named Plateau du Heron, about 35 or 40 feet high, and connected with the point by a strip of sand uncovering at half tide. From 2 or 3 miles westward of Khor Ambada, eastward to Ras Jibuti, the shore is fronted by a gradually widening bank of soundings of from 10 to 30 fathoms with several shallow patches of 2 fathoms and less, and in the bay between Manga Daffa and Jibuti, a mud flat and rocky foul ground extends more than a mile off-shore.

JIBUTI ANCHORAGE.—A reef extends one mile westward of the plateau du Heron, its western edge being marked by three black conical buoys, the northern buoy surmounted by a staff and cage, and the southern buoy being a gas-buoy showing a *fixed white* light. South-westward of this are two other reefs, dry at low water; the outer, marked at its north-eastern corner by a red flat-topped buoy; the inner, at its north-eastern edge by a red conical buoy, lying about $6\frac{1}{2}$ cables S. by E. $\frac{1}{2}$ E. from the red flat-topped buoy. Between these outer reefs and the reef extending from the point, is Jibuti anchorage, in from 4 to 7 fathoms mud, and good holding ground. The anchorage space for large ships is about one mile in length north and south, with a clear space half a mile wide; it is a well sheltered and excellent anchorage. A good berth for a large ship is in 7 fathoms about $2\frac{3}{4}$ cables S.W. by S. from the light-buoy, with leading lights in line, or Direction hill on with Pyramid S. $\frac{3}{4}$ W., and with the flagstaff at the Residency open southward of the outer end of the jetty bearing S.E. $\frac{3}{4}$ E. about $1\frac{1}{2}$ miles. Small vessels may anchor considerably closer in.

Four other shoal patches lie north-westward of the anchorage. One, dry in parts at low water, bears N.W. $\frac{1}{2}$ N. $3\frac{1}{4}$ miles from the plateau du Heron, and its south-eastern end S.W. $3\frac{1}{4}$ miles from Maskali island. The

* In November, 1886, the captain and eight men of the French ship of war *Pengouin* were massacred by the natives, when on watering duty on the border of the northern lake mentioned above.

See chart, No. 253, with plan of Jibuti.

other three patches are situated from the plateau du Heron as follows :—*Méteore* reef, N.W. $\frac{1}{2}$ W. $2\frac{3}{4}$ miles, with a depth of $1\frac{1}{2}$ feet, and marked at its south-east edge with a red flat-topped buoy ; *Penguin* bank of $2\frac{1}{4}$ fathoms, marked at its eastern extreme by a red can buoy, N.W. by W. 2 miles ; and *Etoile* bank of $1\frac{3}{4}$ fathoms, W. by N. $\frac{3}{4}$ N. $3\frac{1}{2}$ miles, having close eastward of it a red conical buoy.

LIGHTS.—From fort Ayabeli, about $1\frac{1}{4}$ miles inland, is exhibited at an elevation of 105 feet above high water, a *fixed white* light, visible in clear weather at a distance of 15 miles.

Near the Ambuli river, from a white square tower at the height of 64 feet above high water, is exhibited a *fixed red* light, visible at a distance of 9 miles ; these lights, 1,112 yards apart, are in line when bearing S. $\frac{3}{4}$ W., and lead to the anchorage.

Two *white* lights, of greater power than the leading lights, are shown in the town, and must not be mistaken for them.

A *fixed green* light is shown from the outer end of the pier, visible at the distance of 2 miles.

A *red light* is hoisted at the Marabout when the French mail steamer is expected.

Town.—There is a pier constructing from Marabout point, and another pier extending to low water mark from the Residency. Jibuti is a small but growing town with several well-built stone houses, stores, and shops ; the streets are clean, and the place is said to be healthy. The French maintain a small garrison of native troops. Landing can be effected at all times of tide.

Coal.—Supplies.—A stock of coal of between 4,000 and 5,000 tons is kept at Jibuti, and is taken off in bulk to vessels by lighters. Water is abundant and of good quality about $1\frac{1}{2}$ miles from the town. Sheep and cattle are plentiful and cheap, the Esa Somális being friendly and bringing in supplies readily.

Communication.—Jibuti is in telegraphic connection with Perim, through Obokh, and thence with all the world. The Messagerie mail steamers call once a fortnight.

Trade.—There is a considerable and growing trade with the interior, caravans bringing ivory, coffee, gold, musk, skins, &c., from Harrar and Abyssinia. This place since its development has absorbed nearly all the trade that formerly went to Obokh.

Directions.—From the northward, pass about $1\frac{1}{4}$ miles westward of Maskali island, the westernmost of the Mashah group, avoiding the reef extending $1\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from it, which has a black can buoy marking its north-western edge ; steer about South for the passage between the reefs westward of Ras Jibuti, and look out for the leading mark, and

See plan of Jibuti on chart, No. 253.

for the buoys. The leading mark is a small white pyramid beacon on the shore, about 14 feet high, in line with a small round hill nearly 7 miles inland bearing about S. $\frac{3}{4}$ W. Leave the black buoys on the port hand and the red buoys on the starboard hand, and anchor as already directed. Vessels from the eastward may pass southward of the Mashah islands and about a mile from the plateau du Heron, passing the black buoys at the distance of about a cable in rounding the shoal.

At night, enter the harbour with the *red* and *white* leading lights of Ambuli and Ayabele in line S. $\frac{3}{4}$ W., and anchor when the *green* light at the end of Jibuti jetty bears S.E. by E. There are no pilots at Jibuti.

Winds.—During the south-west monsoon (June to September) the wind blows regularly from S.W. during the day; it reaches its strength towards noon, and very rarely lasts during the night; it is replaced either by light southerly winds, or by a refreshing breeze from N.E. The wind blows from about East during the north-east monsoon (October to May), commencing at 9 a.m. or 10 a.m., and freshening towards 2 p.m. The Khamsin is not felt here. Winds from the North are extremely rare at Jibuti, and the sea is always smooth, so that this may be considered the safest port on this coast.

THE MASHAH ISLANDS are a coral group from 30 to 40 feet above the sea, on a reef extending E.N.E. and W.S.W. 7 miles, by $3\frac{1}{2}$ miles in width. They consist of three islands and five small rocky islets, nearly in mid-channel between the northern and southern shores of the gulf of Tajura, dividing its entrance into two channels. The northern channel is 7 miles wide, and perfectly free from danger, having no bottom anywhere at 40 fathoms. The southern channel is $2\frac{1}{4}$ miles wide at its narrowest part, between the rocky bank south-west of Maskali and the series of rocky patches extending northward from Jibuti bay; the soundings are regular, from 15 to 20 fathoms, mud.

The islands are dangerous to approach, being surrounded by coral reefs, dry in many parts at low water, with outlying isolated patches, for a distance of from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles. Eastward of them, the soundings are irregular, with overfalls, for a distance of $4\frac{1}{2}$ miles. The eastern island is named Mashah; the westernmost, Maskali.

The reef extends north-westward $1\frac{1}{4}$ miles from the middle island, and uncovers at its outer part, off which there is moored a large flat-topped bell buoy, painted black. The reef south-west of Maskali is marked by a black buoy, as before stated.

LIGHT.—On the north-east point of Mashah island, from a white quadrangular masonry tower, 47 feet high, is exhibited at an elevation of 64 feet above high water, a *fixed red* light, which is visible in clear weather

from a distance of 8 miles. The light shows between the bearings of N. 60° W., through west and south to N. 30° E., and faintly in other directions except on about the bearing N.W., when it disappears entirely.

Anchorage.—There is tolerable anchorage in from 6 to 9 fathoms, sand, in a gap in the reef half a mile northward of the eastern island, with the lighthouse bearing about S.E. $\frac{3}{4}$ S. A good look-out is necessary on entering this anchorage, as there are several rocky patches detached from the main reef; and one of 2 fathoms lies nearly in mid-channel. It affords good shelter at all seasons.

During the north-east monsoon, good anchorage may be had westward of the reefs on the northern side of the islands in 17 fathoms, sand, with the west point of Maskali bearing about S.W. $\frac{1}{2}$ S.

Protectorate.—The French protectorate of the gulf of Tajura which, as before stated, includes the Mashah islands, ceases a few miles south-eastward of Ras Jibuti, the actual line of demarcation being near the eastern side of Lawada bay, about half way between Jibuti and Zeila. From this point the British protectorate of the western and southern coasts of the gulf of Aden commences, and extends as far eastward as Bander Zaida in long. 49° 4' E. The boundaries of these protectorates were defined by treaty in 1887.

Zeila bank of soundings.—From the Mashah islands south-eastward, a bank extends from the shore an average distance of 14 miles, increasing to 17 miles north-eastward of Zeila, from whence the edge of the bank begins to curve to the southward and close in towards the land, so that off Khor Kulangarit, in lat. 10° 59 $\frac{1}{2}$ ' N., it is only 8 miles from the shore. The soundings between Mashah and Zeila, with the exception of the numerous reefs and shoals presently described, increase gradually from the shore to 20 and 25 fathoms, mud, at the distance named, when a narrow ridge of from 14 to 20 fathoms occurs, running in a N.W. by W. and S.E. by E. direction for about 18 or 20 miles, and suddenly falling on its seaward side into no bottom at 40 or 50 fathoms, beyond which depths no soundings have been recorded.

North-eastward of Zeila, at the widest part of the bank, the water deepens very rapidly from 20 fathoms to over 100 fathoms, and 4 $\frac{1}{2}$ miles outside the 100-fathoms line of soundings, at this part, is the Arab shoul, described at page 372. Southward from this, the bank deepens everywhere very rapidly, from 20 or 25 fathoms to 40, 50, and no bottom at 100 fathoms, the narrow shallower bank, near the edge of soundings, being peculiar to that part of the bank between Zeila and the Mashah islands.

The Coast from Ras Jibuti to Zeila, a distance of 24 miles, trends in a south-easterly direction, is low and swampy, thickly covered with mangrove jungle, with several projecting points and bays fronted by a

See chart, No. 253.

reef, dry in some parts at low water, and with several small islets. Between Ras Jibuti and Mersa Dalwakteah, this reef mostly dries at low water and is from 5 cables to $1\frac{1}{2}$ miles wide, but is steep-to, having from 5 to 8 fathoms water close to its edge.

Ras Gumarlah, S.E. $14\frac{1}{4}$ miles from Ras Jibuti and about 10 miles north-westward of Zeila, is a low sandy point of irregular shape, being rounded on its eastern side and projecting westward in the shape of a duck's bill. From the edge of the reef fronting the point, a narrow spit or sand-bank, over which the sea washes at spring tides, extends 5 miles in a N.N.E. direction; this spit is surrounded by a reef of rocks, which reef extends in the same direction about $1\frac{1}{2}$ miles beyond the extreme of the spit. There is a small clump of bushes in the bend of the sandy spit, and between it and the shore reef is a narrow boat channel, available at high water.

Shab Turuhát.—At 3 miles N.N.E. from the extreme of the sandy spit, is Shab Turuhát, a dangerous reef about one mile in diameter, and dry in parts at low water, springs; between it and the spit reef there are irregular soundings of from 3 to 4 fathoms, rocky bottom. Close seaward of the reef, the depths are from 10 to 12 fathoms.

Mersa Dalwakteah.—Immediately westward of Ras Gumarlah is Mersa Dalwakteah, a bay 5 miles wide. A reef, dry at low water, extends from the shore from 5 cables to $1\frac{1}{2}$ miles, between which and Jezirat Dalwakteah, an island connected with the mainland at low water and having a reef extending northward one mile from it, is a very good anchorage for small craft in 4 fathoms water, or a little farther out, in 7 fathoms; this anchorage is perfectly protected, but can only be safely entered at low water, when the numerous coral reefs to seaward of it are visible.* In the depth of the bay, close to the beach, at Lawada, are some wells of good water. The frontier line between the British and French protectorates is in the eastern part of this bay.

Reefs.—In the bay between Gumarlah sand-spit and the reef off Jezirat Dalwakteah, the depths are from 12 to 8 fathoms, muddy bottom. Westward of the northern extreme of the spit at one and 2 miles respectively, are two small rocky patches, dry at low water, springs, but with from 10 to 12 fathoms close to. In a direct line N.N.W. $\frac{1}{4}$ W. from the westernmost of these small rocky patches, and at the distance of about one and two miles respectively, are two other small patches, upon which the least water found was 2 fathoms. Round hill and Coast hill in line S.W. $\frac{5}{8}$ W., leads between them in 11 fathoms. In the depth of the bay and half a mile from the spit reef is another sunken rock with 6 and 7 fathoms close to it.

* Capt. Geo. Wilson, H.M.I.M.S. *Dalhousie*, 1888.

See chart, No. 253, and plan, No. 919.

North from the centre of the Mersa and $3\frac{1}{2}$ miles from the shore, but only $1\frac{1}{4}$ miles from the shore reef, with from 8 to 9 fathoms water between, is Moidubis Seghir reef, about 8 cables in diameter and dry in places at low water.

The channel between Moidubis Seghir and the shore reef southward of it has from 7 to 8 fathoms water on either side of a small patch with about 3 fathoms water, nearly in mid-channel. Guttatella Ousal, a reef $1\frac{3}{4}$ cables in diameter and also dry at low water, lies 2 miles north-westward of Moidubis Seghir, with from 11 to 12 fathoms between. Three small detached reefs lie about 2 cables from Guttatella Ousal, one on its eastern side and two southward of it.

Moidubis Kebir reef is $1\frac{1}{2}$ miles long north and south, by three-quarters of a mile wide, lying from $1\frac{1}{2}$ to 3 miles northward of Moidubis Seghir, with 13 fathoms, mud bottom, between.

Islets.—Eastward of Ras Gumarlah, on the edge of the shore reef, which here extends 3 miles in a north-easterly direction, are three small islands covered with bushes, named Jezirat Mosheikh, between which and Gumarlah spit is the boat channel before mentioned.

There is a deep bay on the eastern side of Ras Gumarlah sand-spit, between it and the islands of Aibat and Sad-ad-din, about 4 miles wide and with depths of from 13 to 6 fathoms. With the exception of one rocky patch $1\frac{1}{4}$ miles eastward of the middle part of the sand-spit, the bay is clear of dangers, but the shore reef extends off as far as the outermost of the three Mosheikh islets.

SOMÁLI COAST.—**Inhabitants, trade, &c.**—From the neighbourhood of Zeila to Ras al Khyle, southward of Ras Hafun on the eastern coast of Africa, the country is known by the name Bar-e-Somál, and it is divided between two nations, both of which trace their origin from the Arab province of Hadramaut, but are at bitter and endless feud with each other. The westernmost of these two great families extends from the borders of the Esa-Somáli tribe, who reside in the neighbourhood of Zeila, to Bander Hashau, a few miles eastward of Burnt island, and is divided into three great tribes, viz., the Haber-Gerhajis, the Haber-Awal, and the Haber-Toljaala, so named from their being descended from three sons of Isaak, the word *haber* signifying *the sons of*. Isaak crossed from Hadramaut some time after his countrymen had founded the nation to the eastward, which is still the most important of the two great families. He settled at the town of Mait, near Burnt island, where his tomb exists to this day. The eldest branch, the Haber-Gerhajis, was put in possession of the frontier mountains to the southward; the other two brothers were placed on either side of them, the Haber-Awal establishing themselves on the low lands from Zeila to Berbera, and the Haber-Toljaala locating

themselves at Anteral, Karam, Ankor, and Hais, four small ports eastward of Berbera. Eastward of Mait, as far as Bander Zaida, is the warlike tribe of the Warsangali, which name means, has brought good news; and from thence eastward round Ras Jard Hafun and down to Ras al Khyle, the country belongs to the numerous clans of the Mijertein. These are the tribes inhabiting the coast. Although at constant war amongst themselves, they are friendly and obliging to strangers.

From the neighbourhood of Berbera to Ras al Khyle, the Wadi Nogal extends in almost a straight line between two ranges of mountains. The happy valley is spoken of in the most glowing terms by the natives, and apparently forms their great road for trade; the people of Ogahden, Murreyhan, &c., bring all their gums, ivory, and ghi along this valley, as being the safest and least fatiguing route, and the people are described as a peaceful race, who subsist chiefly by the chase and by their sale of ostrich feathers, myrrh, and ghi (clarified butter).

Trade.—Sheep form the principal export in the western parts of the coast under consideration, and as far eastward as Karam, countless flocks being driven down annually and shipped off to Arabia; and Berbera is the chief mart during the trading season, viz., from October to March. But, from a commercial point of view, the Mijertein and Warsangali territories are the most valuable, and by far the largest quantity of gum-arabic, luban, and myrrh are collected from the sea coast villages belonging to these tribes, though a small portion passes through Zeila.

Westward of the Warsangali range, gum trees are scarce, and though some ports have considerable trade throughout the year, all the gums are brought from the Dalbahanti and Ogahden tribes. The Warsangali range itself, described at page 384, affords an inexhaustible supply of frankincense, though but little gum-arabic, and no myrrh.

In the country of the Haber-Gerhajis, the principal articles of trade or produce are ghi, myrrh in small quantities and of inferior quality, luban of the first quality, ivory, ostrich feathers, and gum-arabic, with a small quantity of sheima or orchilla weed, and a still smaller supply of warus, a kind of saffron used by the natives in Yemen to rub over their bodies.

The city of Harrar, in the province of that name, though hardly in the Somáli country is closely connected with it by its commerce. It is thirteen days' journey, or 83 hours, from Zeila, a distance of about 180 miles, and twenty-two days' journey, or 156 hours, from Berbera, distant about 286 miles. The city is said to be larger than Mokha, situated in a fertile country, and with a population of about 36,000.* The coffee districts are described as lying amongst a low range of mountains just southward of Harrar. The quantity exported was very large, and the quality fully

* See Proceedings of Royal Geographical Society, February, 1885.

See charts, Nos. 6a and 6b.

equal to that commonly sold at Mokha. Besides coffee, Harrar exports white cotton cloths, the cotton being grown at Harrar; a few silk loongis are also manufactured. Cardamons, gum-mastic, myrrh, a small quantity of manna, saffron, and safflower, with the articles above mentioned, comprise the extent of the Harrar trade so far as regards produce; but the most valuable branch of commerce was formerly the export of slaves. The duties levied at Harrar are 10 per cent. on import and export.

ZEILA, in lat. $11^{\circ} 21' N.$, long. $43^{\circ} 29' E.$, and under British protection, *see* page 368, is a place of some importance, being the only port on the Esa Somali coast, except the French port of Jibuti. The principal trade of Zeila is with Aden and the neighbouring parts. It is built on a low sandy spit projecting north-eastward and nearly level with the sea, and consists of many stone houses and some 600 huts; the streets are narrow and tortuous. The government is administered by an Assistant to the Political Resident at Aden, and a detachment of troops is stationed here. The population in 1898-99 amounted in the trading season to about 15,000.

Winds, weather, &c.—The heat at Zeila is excessive during the South-west monsoon, and more than half the natives then move to the highlands in the interior. H.M.S. *Penguin* found the temperature in July, at mid-day, to be over 100° in the shade. *See* Appendix, p. 484.

Supplies.—Water is difficult to obtain, it having to be brought from the water-course 4 miles south-westward of the town. Sheep may be procured.

Trade.—The principal articles of export are coffee, dye, ghi, hides, skins, ivory in small quantities, ostrich feathers, and gums. The imports are rice and grain, dates, grey shirtings, cloths, jowari, and tobacco. The total value of trade, export and import, for 1898-99, was about 370,500*l.* In the same year, 85 steamers and about 704 native craft entered the port.

Pier.—The Custom-house is at the western end of the town, with a stone pier or causeway extending off from it in a north-westerly direction about 500 yards; at present it is not accessible to boats after half ebb.

Shoals in the approach.—The principal shoals in the neighbourhood of Zeila, some obstructing the approach, whilst others form and protect the harbour, are as follows:—The Arab shoal, in the fairway to the port but outside the bank of soundings; Aibat and Sad-ad-din islands with their extensive reefs lying northward of the town; Shab Filfil and the Seagull shoal lying north-eastward of the town; and, the Channel reef nearly in mid-channel between Shab Filfil and the Aibat reefs.

Arab Shoal, with a least depth of $4\frac{1}{4}$ fathoms, is in lat. $11^{\circ} 39' N.$, long. $43^{\circ} 40' E.$, or about 20 miles north-eastward of Zeila. From this position, a bank of sand and coral, about 8 cables wide with 7 and 8 fathoms water, extends E. by N. about 2 miles, and also about 7 cables

to the westward. Beyond these limits, the depths increase rapidly to the 100-fathoms line, between which and the corresponding limit of the shore bank of Zeila, the distance is about 3 miles. The shoal is not easily seen.

Current.—On the Arab shoal during two days in February, with light northerly and north-easterly winds, the current set south-eastward from one to $1\frac{1}{2}$ knots an hour. The currents on this coast, as a rule, set with the prevailing wind, but they cannot be relied on.

Shab Filfil.—Shab Filfil is a sunken reef off the hard sand-banks extending eastward from Zeila, and bears N.E. by E. about 8 miles from the town; it is a coral reef of oval form, $1\frac{1}{2}$ miles in length, north-west and south-east, by about 9 cables in width, and never uncovers.

Seagull shoal.—Buoy.—The northern extreme of this reef lies about one mile south-eastward of Shab Filfil. It is about $2\frac{1}{2}$ miles in length, $1\frac{1}{2}$ miles in width, irregular in shape, and never uncovers. The northern edge of the shoal water extending from it is generally marked by a black can buoy, but it often breaks adrift.

Both these reefs are steep-to on the north-eastern or outer side, the depths increasing rapidly to 20 fathoms. On the inner side, and between them, the depth is from 3 to 6 fathoms. They are at all times very difficult to see, and should be carefully avoided.

A third reef, not named, circular in shape and half a mile in diameter, lies one mile southward of Shab Filfil and half a mile westward of the north end of Seagull shoal.

The passage between these reefs is clear of danger, but owing to the difficulty in seeing the two larger reefs, and the want of leading marks, the passage should not be attempted unless certain of the buoy being in position.

Channel reef.—Buoy.—This is a coral patch half a mile in extent, of from $1\frac{1}{4}$ to $2\frac{1}{2}$ fathoms, and it lies about N.W. by W. $1\frac{1}{4}$ miles from the north-western point of Shab Filfil. A black conical buoy with staff and ball is generally moored on its north-eastern edge. See page 376.

Depths.—There is a $3\frac{1}{2}$ -fathoms patch between Channel reef and Shab Filfil, half a mile from the latter; otherwise the channel is clear and the depths from 6 to 7 fathoms. Between the Channel reef and Aibat reefs, the depths are from 7 to 9 fathoms and the channel clear.

Aibat island.—Reef and Buoy.—Aibat island is low and sandy, with bushes on it, $1\frac{1}{4}$ miles in length and about 3 cables in breadth. Its south-western point, which is $8\frac{1}{2}$ miles N. $\frac{1}{2}$ W. from the mosque at Zeila, is steep-to, there being 6 fathoms within a short distance. On all other sides it is surrounded by a reef which extends about 4 miles in an

easterly direction, with a breadth of about 3 miles, and is dry in places at low water. The eastern extreme of this reef is usually marked by a black conical buoy, with staff and triangle, moored in 6 fathoms.

A Beacon, white and conical, stands on the northern part of Aibat island, low down on the beach; generally it only appears conspicuous when the sun is in a favourable position.

Reefs.—At one mile N.W. by W. from the beacon, and separated from the main reef by an 8-fathoms channel about $2\frac{1}{2}$ cables wide, is a small patch of coral. Both this and the large reef are at all times easily seen. From the south-western extreme of Aibat island reef, a tongue of reef extends for $1\frac{1}{4}$ miles in a S.W. by S. direction, with from $1\frac{1}{2}$ to 3 fathoms water.

Sad-ad-din island forms the northern side of Zeila roads. It is about 2 miles long N.N.E. and S.S.W. and $1\frac{1}{2}$ miles wide, low and sandy, of coral foundation, and for the most part covered with bushes, the tops of which are about 20 feet above the sea. It is surrounded by a bank of coral, mud, and sand, which uncovers at low water. This bank extends about half a mile on the eastern side, and from that to one mile on all other sides. Between the shoal water extending nearly one mile north-westward of Sad-ad-din, and that from Aibat island reef, there is a channel about $2\frac{1}{2}$ cables in width, with from 6 to 7 fathoms. From the absence of leading marks, caution is necessary in passing between these islands.

Banks.—Buoy.—On the eastern side of Sad-ad-din, a bank connected with the island and with less than 2 feet water in places, extends $1\frac{1}{4}$ miles in a north-easterly direction. Outside this bank, at $2\frac{1}{4}$ miles eastward of Sad-ad-din, there is a narrow detached bank $1\frac{1}{4}$ miles in length N.E. by N. and S.W. by S., upon which are depths of $4\frac{1}{4}$ to 5 fathoms. Nearly a mile southward of the connected bank, and $1\frac{1}{4}$ miles E. by S. from the southern point of Sad-ad-din, is a $2\frac{1}{2}$ -fathoms patch surrounded by 4 and 5 fathoms water. This latter patch is marked at its southern side by a red conical buoy, moored in $3\frac{1}{4}$ fathoms.

Depths.—Immediately outside a line drawn from the north-eastern side of the Aibat island reef to that of Shab Filfil, in the approach to Zeila roadstead, the depths are from 12 to 20 fathoms; directly that line is crossed they decrease to 9 and 7 fathoms on either side of the Channel reef. The general depth between the eastern sides of the reefs surrounding Sad-ad-din and Aibat island, the Channel reef, and Shab Filfil, is from 6 to 7 fathoms, but for more than a mile eastward of the 2-feet bank just described, extending from Sad-ad-din island, the soundings are irregular, there being numerous patches of $4\frac{1}{4}$ fathoms, for the avoidance of which reference to the chart is necessary.

Zeila roadstead.—The available anchorage ground in Zeila roads between the mainland and Sad-ad-din island, in not less than $3\frac{1}{2}$ fathoms, is about one mile in width, North and South, by about 3 miles East and West. In the centre, there are from 4 to 5 fathoms, mud and sand, good holding ground. It shoals very gradually on the southern side towards the town, but just within the edge of the 3-fathoms line, on that side, and N.E. by N. $1\frac{1}{2}$ miles from the pier-head, is a patch with only one foot water. On the northern side, the edge of the shoal water is steeper.

On the western side of the roadstead the approach is almost entirely blocked by a line of sand-banks, dry at low water, which extends from Ras Takusha, 4 miles N.W. by W. from the town, to the south-western part of the Sad-ad-din banks. All the south-western part of the road is shallow, the average depth being about $2\frac{1}{2}$ fathoms. S.W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles from the south-western point of Sad-ad-din, there is a 3-foot patch.

The spit on which the town is built is continued as a shoal, dry in places at low water, about $1\frac{1}{2}$ miles in width, and terminating about $3\frac{1}{2}$ miles E.N.E. of the town. There is a wreck on the south-east edge of the above shoal.

Anchorage.—The best anchorage in Zeila roadstead is in about 4 fathoms, at 2 miles north of the town. During the North-east monsoon a moderate swell sets into the anchorage, increasing generally towards the afternoon.

Winds and weather, &c.—See Appendix, page 484.

Tides.—It is high water, full and change, at Aibat island about 7h. 45m., springs rise from 8 to $9\frac{1}{4}$ feet; neaps from $5\frac{3}{4}$ to $8\frac{1}{4}$ feet. Except at springs, the tides are exceedingly irregular, both as to rise and fall, and time of high water. At springs, the flood usually sets westward through the roads, and the ebb eastward, at the rate of half a knot, but this is not to be depended on, as the set is much influenced by the winds.

A strong current often sets along the coast off Zeila as much as 17 miles in the day; the direction is usually, but not always, with the wind.

Directions.—The best time for entering Zeila is in the morning. As the land in the vicinity is low and the shoals extend a considerable distance off-shore, there are no distinct landmarks by which a vessel may ascertain her position until near the reefs. Vessels, therefore, bound for Zeila will do well to make Aibat island, as the beacon upon it is the best mark. The lead will be found an assistance, and a cast on the Arab shoal is always an excellent guide. The passage between Aibat island reef and Channel reef is the best. From abreast of the buoy off Aibat island reef to the anchorage, the course direct for the town is about S.S.W. $\frac{3}{4}$ W., but this leads over the $4\frac{1}{2}$ -fathoms patches eastward of Sad-ad-din island, and the navigation must be principally by the chart.

Vessels from the south-eastward, if assured that the Seagull buoy is in position, may pass close northward of it on a $W. \frac{1}{2} S.$ course for the buoy marking the shoal eastward of Sad-ad-din island, hauling in to the anchorage at the proper time by the chart. But, if intending to enter by the passage between Channel reef and Aibat island reef, they should on no account shoal their water to less than 20 fathoms until northward of Shab Filfil. From about one mile outside this reef, Sad-ad-din and Aibat islands, as well as the town of Zeila, are visible from aloft; Sad-ad-din, being the higher, is first seen; Conical hill, 371 feet high and 11 miles westward of the town, may possibly be a useful mark in clear weather. The beacon on the northern extreme of Aibat island may be steered for, if seen, when bearing westward of N.W. by $W. \frac{1}{2} W.$ until within 5 miles of it, or until the northern extreme of Sad-ad-din bears $W.S.W. \frac{1}{2} W.$, when alter course for the town, bearing about $S.S.W. \frac{1}{2} W.$, and proceed by the chart to the anchorage.

Caution.—The shape and colour of the buoys cannot be depended on, the positions are also uncertain, and they are frequently absent altogether.

The Coast.—From Zeila, the coast takes a general $S.E. \frac{3}{4} S.$ direction for 78 miles to the neighbourhood of Jebel Almis, and within 2 or 3 miles of Bulhar; it then trends almost due East 39 miles to the entrance of Berbera. The whole extent of this coast is low and sandy near the shore, but rising gradually towards the mountains which bound it in the interior at an average distance of 18 or 20 miles, but which approach within a few miles of the sea westward of Bulhar and again in the vicinity of Berbera; the recession of the mountains from the shore in this latter space forms so deep a curve that, the coast being very low, it has, from the offing, all the appearance of a considerable bay.

In the whole line of coast here described, the only places of the least importance are Bulhar and Berbera. The low lands between Kulangárit and Berbera, a fertile tract perhaps 40 miles in depth and 90 miles in length, is chiefly occupied by the Haber-Awal tribe. The number of sheep and camels found on these plains is almost incredible—the latter are small and weak.

From Zeila to Ras Maskan, the shore is low and swampy for about 11 miles, with a range of sand-hills from 30 to 40 feet high about 2 miles inland from the beach, which latter is fronted by a reef and shoal water extending from 5 cables to a mile off-shore.

Ras Maskan, in lat. $11^{\circ} 11' N.$, long. $43^{\circ} 34' E.$, is a low point with a reef of rocks extending upwards of one mile off it. Within the point, during the rainy season, December—February, there are several pools of fresh water in the bed of a watercourse.

In or off the bay formed between Zeila spit and Ras Maskan the depths are from 8 to 5 fathoms, but within this space are the following shoals:—

Shab Sheikh Yakub, a reef of rocks half a mile in diameter and partly dry at low water, having 4 to 6 fathoms close around, lies 4 miles off-shore, with Zeila mosque bearing N.W. $\frac{3}{4}$ W. 6 miles. A rocky patch of $2\frac{1}{2}$ -fathoms water, and 4 fathoms close to, lies about midway between it and the shore; also, a bank with 5 fathoms water nearly 2 miles S. by E. $\frac{1}{2}$ E. from Shab Sheikh Yakub.

At $2\frac{1}{2}$ to $3\frac{1}{2}$ miles north-eastward of Ras Maskan is a dangerous reef of rocks about a mile in diameter and awash at low water, with from 5 to 6 fathoms close to all round, except on its eastern side, where there is 9 fathoms near the reef.

With the exception of these reefs and shoals there are no other known dangers than those already described off Zeila; outside the shoals, the depths increase gradually to 40 and 50 fathoms, beyond which no soundings have as a rule been taken.

Khor Maduji is a small inlet 5 miles south-eastward of Ras Maskan and 7 miles north-westward of khor Kulangárit, with which it is said to be connected by a swamp or backwater. The shore between them is low and sandy, and the range of sand-hills, as before described, continues to the south-eastward at one or 2 miles within the beach. This khor is much frequented during moderate weather by small boats from Berbera, Zeila, and Tajura for firewood and wood for house-building.

At $1\frac{1}{2}$ miles N.E. by N. from khor Maduji is a one-fathom bank on which the sea breaks heavily at times, with 7 fathoms close to.

Shab Maduji is a dangerous reef about 2 miles in length by upwards of one mile in width, between khor Kulangárit and khor Maduji, and from $1\frac{1}{4}$ to $3\frac{1}{2}$ miles from the nearest shore, between which and it is a 6-fathoms channel. The dry part of the shoal near the south-eastern end, bears from khor Kulangárit N.N.E. about 4 miles. Seaward of it the soundings are regular, there being 10 and 11 fathoms at $1\frac{1}{4}$ miles; but, between the shoal and the shore, the soundings are irregular, the south-western part of the shoal being a detached bank with from 2 to 3 fathoms, on either side of which there are from 7 to 8 fathoms, the 6-fathoms channel mentioned being in-shore of this bank.

Khor Kulangárit is a small and shallow inlet $7\frac{1}{2}$ miles south-eastward of Khor Maduji, and can only be entered by small boats at high water. A low sandy plain extends to the foot of the mountains, which are distant about 20 miles.

Shab Kulangárit, a dangerous rocky patch awash at low water, with from 9 to 11 fathoms close around, is distant from the shore 2 miles, with the entrance of the Khor bearing W.N.W. $5\frac{1}{2}$ miles, and a thick

clump of bushes about three-quarters of a mile from the beach, resembling a tree when seen from a distance, S.W. by W. $\frac{3}{4}$ W.

Shoal patches.—On January 23rd 1890, *H.M.S. Ranger* reported passing between three shoal patches, the most seaward of which appeared to be about 4 miles from the shore; 10 fathoms water was obtained between the patches. The estimated position of these shoal patches, long. $43^{\circ} 46' 15''$ E. and about 4 miles from the shore, would place them about $1\frac{1}{2}$ or 2 miles N.N.E. from Shab Kulangárit.

CAUTION.—Until further examination has been made of this neighbourhood, ships should not come within 6 miles of the shore hereabout.

The coast from Kulangárit to Berbera has not been surveyed, but there is said to be no danger between those places; the shore is generally bold, with from 6 to 7 fathoms water close in, but in addition to the caution just given, it may be remarked that the fact of its not having been closely examined should induce great watchfulness in approaching it.

The 20-fathoms contour-line is about 7 miles from the shore off Kulangárit; from thence, it gradually closes the shore until abreast of Jebel Almis, when it is only about $1\frac{1}{2}$ miles off-shore, which distance it maintains as far as Berbera; close outside of this line, there is no bottom at 40 fathoms.

Dungareta, about 48 miles south-eastward of Zeila and 24 miles beyond Khor Kulangárit, is in lat. $10^{\circ} 43' N.$, long. $43^{\circ} 57' E.$ The low coast-line for many miles here is covered with low brushwood, but Dungareta, which is not a village but merely the name of a district, may be distinguished by two small groups of palm trees which show out well when seen either from the south-eastward or north-westward; the high mountains at some distance inland are visible in clear weather. There is anchorage from 3 to 4 cables off-shore, in about $6\frac{1}{2}$ fathoms.

Sama-wa-nak is about 14 miles south-eastward of Dungareta, and 20 miles north-westward of Bulhar, and may be identified by a cluster of date palms growing near the shore. There is anchorage in 6 fathoms, sand, about three quarters of a mile from the beach.

Jebel Almis, at the head of the bight here formed in the coast, is a rugged irregular mountain, the highest peak being rather more than 2,000 feet above the level of the sea and distant from the beach about 8 miles. The shore from thence trends eastward to Berbera.

BULHAR is a large village or town on the shore about 12 miles eastward of Jebel Almis, and 37 miles westward of Berbera. It is a British possession, and the Government is administered by a Deputy Assistant Political Agent, acting under the Resident at Aden; the Agent

resides here during the North-east monsoon season, which is the time of commercial activity. The town and trade are improving rapidly; the place owes its importance to its position, viz., its proximity to the last defile to be passed in coming from Harrar to the sea. The population is said to be about 11,000 souls during the trading season, but during the remaining six months of the year it dwindles to about 6,000, as the tribes migrate to the highlands in the interior.

LIGHT.—A *fixed white* light elevated 19 feet above the sea, and visible about 8 miles, is exhibited from the top of the prison at Bulhar.

Anchorage.—There is anchorage about half a mile from the shore in 6 to 7 fathoms, with the village bearing between S.E. by S. and S.S.W. When within 2 miles of the town, vessels should approach slowly, as the water shoals rapidly from the edge of soundings to 10 and 6 fathoms. Within the latter depth the soundings decrease very gradually to within a cable of the beach, when there is a sudden drop from 4 to $1\frac{1}{2}$ fathoms. There is no safe anchorage during the greater part of the South-west monsoon.

Some conspicuous date trees just eastward of the town, the only trees of any kind near the shore between this place and Berbera, as well as Jebel Almis to the westward, serve to point out the position of Bulhar from the offing. The town itself is difficult to make out in approaching from seaward, especially if the sun is behind it; the Residency is the first building seen.

BERBERA, in lat. $10^{\circ} 26' N.$, long. $45^{\circ} 1' E.$, passed into the hands of the British in November 1884. It is the only harbour on this coast, and is formed within a low sandy spit extending westward nearly $1\frac{1}{2}$ miles and terminating in Tamar point, which point is steep-to, having 10 fathoms water at one cable from it. The harbour thus formed lies in an E. by N. and W. by S. direction and affords good anchorage and complete shelter from all but westerly winds.

Depths.—The navigable width of the entrance, with from 4 to 13 fathoms water, is 5 cables; the deepest water, 13 fathoms, being close to Tamar point; the central depth is 10 or 11 fathoms, from whence it shoals gradually to the 4-fathoms line at about 3 cables from the southern shore of the harbour. From the entrance, the central depths up the harbour are 10, 9, 7, and 5 fathoms, until within 3 cables of the custom-house, at the head of the port, and a depth of 3 fathoms may be carried until within $1\frac{1}{4}$ cables of the shore at the head. The available width for anchorage in 4 fathoms or more, gradually decreases from 5 cables in the entrance to $1\frac{1}{2}$ cables at $2\frac{1}{2}$ cables from the custom-house; the length for anchorage in the depths named is about $1\frac{1}{4}$ miles in extent.

LIGHTS.—On the southern shore of the entrance to Berbera, near high water mark, is a tower painted with red and white bands and about 70 feet high, from which the light was formerly shown. The light, *fixed white*, is now exhibited from a mast 30 feet high close to the tower, at an elevation of 49 feet above high water, and is visible in clear weather at a distance of 8 miles.

From the top of a white building near the custom-house and close to the beach, is exhibited a *fixed red* light visible in clear weather from a distance of 6 miles; from a red framework above one of the highest houses and about 300 yards farther inshore, is shown another *fixed red* light, also visible 6 miles. The above lights in line E. by N. $\frac{1}{4}$ N., lead in the fairway up the harbour to the anchorage.

A Beacon about 24 feet high stands on the highest part of Tamar point. The masonry is 12 feet high, white, dome-shaped, and surmounted by a staff and drum.

Pier.—A screw pile pier, connected with the mainland by a stone causeway, fronts the European town of Berbera. At low water there are 10 feet of water at its head.

Tides.—It is high water, full and change, approximately, at Berbera, at 9h. 30m.; springs rise $8\frac{1}{2}$ feet, neaps 6 feet.

Directions.—Eastward of Berbera, there is a high irregular mountain, which, seen on a S.W. by S. bearing, has six peaks, all inclined to the eastward; at the apparent length of this mountain to the westward, is a very remarkable gap or pass, and a short distance farther westward is Berbera. These marks, together with Jebel Almis away to the westward, all tend to make the position of Berbera easy of recognition from whatever direction it may be approached. On nearing the port, the first object to be seen is fort Farhaad, on the hill $1\frac{1}{2}$ miles southward of the town, then the minaret; neither the old lighthouse nor the beacon on Tamar point, are visible at any great distance. Approaching Tamar point, the old lighthouse bearing South leads well westward of Tamar point spit; and when the red framework of the rear light is in line with the front light support on the house near the centre of the Custom-house (a long, one-storied, white building which, being low, is not readily seen, but when seen cannot be mistaken for any other), bearing E. by N. $\frac{1}{4}$ N., they should be steered for. Vessels may then anchor according to draught. At night, the lights may be steered for on the same respective bearings. The holding ground is good. Vessels visiting the port from July to September should have plenty of room to veer, as the wind then frequently blows from South to S.W. with a force of from 8 to 9. These winds blow most persistently and generally begin about 10 p.m. lasting till noon of the following day; occasionally they last for two days.

The Town of Berbera is at the head of the harbour, and though rapidly increasing in size and importance since it became a British possession, varies in dimensions and population according to the season of the year. The old native town was burnt down by accident in June 1888; the new town is laid out in broad streets at right angles to each other, and the greater part of the houses are now constructed of masonry. Fronting the shore, at the head of the port, is the white Custom-house as already described. Southward of the Custom-house are the police barracks, also white and with a flagstaff. The European town, known as the Shaab, is on the south-eastern side of the harbour, and consists of stone houses, gardens, fortified barracks, the agency bungalow, court-house, and other offices, waterworks, reservoirs, &c. There is a mosque with a minaret, and a white building with a dome at the eastern end of the town, over the tomb of Sheikh Yussuf. The Government is administered by an Assistant to the Resident at Aden, and a detachment of British Indian troops is quartered here.

Climate.—The climate is by no means unhealthy though intensely hot during the South-west monsoon. In the North-east monsoon, it is cool and agreeable by comparison, though with a good breeze outside, it is generally calm in the harbour. Exposure to the powerful summer sun should be avoided when possible.

Trade.—Nearly the whole trade of Berbera is with or through Aden, but there is some small traffic with ports of the Red sea and Persian gulf. From October to March, the trading season, the population amounts to about 30,000 souls, and during the remainder of the year to about 20,000. Traders from the tribes of the interior commence to assemble in October, and are constantly arriving as late as March, bringing with them the produce of the country, which consists of skins, feathers, ghi, myrrh, gums, coffee, sheep, goats, &c.; these are exchanged for cotton, piece goods, rice, dates, sugar, &c. During the trading season, the numerous arrivals from abroad by sea as well as from inland, cause some confusion in the town, as well as a perfect Babel in languages. The trade of Berbera, and of all the Somáli coast, is conducted by agents called *abbans*, and anyone wishing to open business must appoint one of these, but the authorities should first be consulted. The value of the exports and imports for the ports of Berbera and Bulhar in the year 1898–99 amounted to about 377,900*l*.

Supplies.—Fresh water is laid on to the pier, from which boats may obtain it, but to those who can obtain distilled water, it is not recommended for drinking purposes. Plenty of fish may be taken with the seine off Tamar point. Berbera has long been one of the chief sources from whence the port of Aden has derived its supplies of sheep and cattle. There is

constant communication with Aden and Bulhar in the trading season, steamers calling frequently.

The Coast.—From Ras Tamar at Berbera, the coast trends N.E. by E. $\frac{1}{2}$ E. 24 miles to Ras Kathib, and, from thence, E. by N. $\frac{3}{4}$ N. 32 miles to Ras Khanzir. The coast throughout is low and sandy, and, as far as Ras Kathib, soundings extend from one to 2 miles off-shore. Off Ras Kathib, the edge of the bank is only one mile from the shore. Between Ras Kathib and Ras Khanzir, the bank of soundings extends from 2 to 6 miles off-shore, and the depths are more convenient for anchoring than either westward of Ras Kathib or eastward of Ras Khanzir. The bottom in-shore is of sand and shells; off-shore, of sand and coral. Many hills of various heights rise at a short distance from the shore throughout this range of coast-line, and are backed farther inland by the Jebel Kalsam range, the highest peak of which, 2,620 feet above the sea, bears S.E. $\frac{1}{2}$ E. 10 miles from Berbera, and S.W. by S. 22 miles from Ras Kathib.

Ras Alweni is a low sandy point about 8 miles north-eastward of Berbera; close off it is a sunken rock. There are no soundings at 100 fathoms beyond $1\frac{1}{2}$ miles from the point.

Seyara is a place about 18 miles north-eastward of Berbera, where are some wells of good water about 60 yards from the beach.

Anchorage.—There is anchorage off Seyara in 10 fathoms, about half a mile from the shore, but affording no protection from winds from seaward. Eastward of Seyara is a hill of the same name, 1,240 feet in height and $3\frac{1}{2}$ miles inland.

Ras Kathib, in long. $45^{\circ} 20'$ E., is a low sandy point, off which the edge of the bank is again only one mile from the shore. This point must not be mistaken for another of the same name about 115 miles farther eastward.

Ras Walhun is a low sandy point, projecting from the centre of the bay formed between Ras Kathib and Ras Sudda, about 9 miles distant from each. From it a shallow spit extends three-quarters of a mile off-shore. Between the point and Anteral, is Kamada hill, 235 feet high. Westward of Ras Walhun, the shore is low and sandy, and trends about W. $\frac{1}{4}$ N. to Ras Kathib; at $3\frac{1}{2}$ miles inland are several peaks varying in height from 1,000 to 1,250 feet. The soundings on this part of the coast are shoaler, the 10-fathoms contour-line being 2 miles from the shore, decreasing gradually in depth towards it; the edge of the bank is 4 miles distant and very steep, the soundings suddenly dropping off from 15 to 65 fathoms.

Anteral is a small village consisting of one stone house and a dozen or more moveable huts, about 3 miles south-westward from Ras Sudda ; it has a large trade with Aden in sheep. There is tolerable anchorage off the village in from 6 to 8 fathoms, at from one to $1\frac{1}{2}$ miles from the shore ; the 10-fathoms line is 2 miles and the edge of the bank nearly 7 miles distant from the shore. Small craft find good shelter from easterly winds.*

Ras Sudda, from which Ras Khanzir is distant 14 miles in an E.N.E. direction, is a low rocky point, with a reef extending about 200 yards off it, immediately outside of which there are 16 and 18 fathoms water. The depths increase gradually from the shore to 26 fathoms at $3\frac{1}{4}$ miles distance, from whence the edge of the bank is steep.

Ras Hamra, 235 feet high, is 7 miles farther north-eastward from Ras Sudda ; it projects but slightly beyond the coast-line.

Karam, a village 4 miles north-eastward of Ras Hamra, and 3 miles south-westward of Ras Khanzir, is one of the most important villages of the Haber-Toljaala branch of the western Somális, from its possessing a tolerable anchorage and being about the nearest point to Aden, which bears from it about N. by W. $\frac{5}{8}$ W. 124 miles. What greatly enhances the value of Karam is its being within four days' journey of the country of the Dalbahanta, who, therefore, naturally have a considerable trade through it, though their principal trade is now through Berbera. Karam presents much the same appearance as Anteral, but there are more huts, and in the trading season it is a busy place. A small detachment of Aden police are stationed here to keep order.

The Anchorage is westward of the village in from 4 to 10 fathoms, sandy bottom, at from 3 to 8 cables from the shore, where there is tolerably good shelter from easterly winds. Soundings extend about 3 miles off-shore.

Ras Khanzir, in lat. $10^{\circ} 51\frac{1}{2}'$ N., long. $45^{\circ} 49'$ E., is a low rocky point with sandy beaches on either side; inland is a range of irregular hills of various heights, Tree hill, 1,775 feet high, being 4 miles south of the point. The edge of the bank of soundings, immediately off the Ras, is less than 2 miles distant.

Ghubbet Ankor.—From Ras Khanzir to Ankor, a distance of 25 miles in an E. by S. $\frac{1}{2}$ S. direction, the low sandy coast is slightly concave, forming Ghubbet Ankor. The soundings here are deep, but extend farther off-shore near Ras Khanzir than farther eastward, the edge

* Lieut. W. P. Lodder, H.M.S. *Mariner*, reported in 1888, that the bay westward of Ras Sudda appears to be deeper than as shown on the chart, according to which "when Ras Khanzir is shut in by Ras Sudda you are only $1\frac{1}{2}$ miles from the land, whereas we were actually about 3 miles."

See chart, No. 6b.

clump of bushes about three-quarters of a mile from the beach, resembling a tree when seen from a distance, S.W. by W. $\frac{3}{4}$ W.

Shoal patches.—On January 23rd 1890, H.M.S. *Ranger* reported passing between three shoal patches, the most seaward of which appeared to be about 4 miles from the shore; 10 fathoms water was obtained between the patches. The estimated position of these shoal patches, long. $43^{\circ} 46' 15''$ E. and about 4 miles from the shore, would place them about $1\frac{1}{2}$ or 2 miles N.N.E. from Shab Kulangárit.

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The 20-fathoms contour-line is about 7 miles from the shore off Kulangárit; from thence, it gradually closes the shore until abreast of Jebel Almis, when it is only about $1\frac{1}{2}$ miles off-shore, which distance it maintains as far as Berbera; close outside of this line, there is no bottom at 40 fathoms.

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See chart, No. 66, and plan, No. 919.

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LIGHT.—A *fixed white* light elevated 19 feet above the sea, and visible about 8 miles, is exhibited from the top of the prison at Bulhar.

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Some conspicuous date trees just eastward of the town, the only trees of any kind near the shore between this place and Berbera, as well as Jebel Almis to the westward, serve to point out the position of Bulhar from the offing. The town itself is difficult to make out in approaching from seaward, especially if the sun is behind it ; the Residency is the first building seen.

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Depths.—The navigable width of the entrance, with from 4 to 13 fathoms water, is 5 cables ; the deepest water, 13 fathoms, being close to Tamar point ; the central depth is 10 or 11 fathoms, from whence it shoals gradually to the 4-fathoms line at about 3 cables from the southern shore of the harbour. From the entrance, the central depths up the harbour are 10, 9, 7, and 5 fathoms, until within 3 cables of the custom-house, at the head of the port, and a depth of 3 fathoms may be carried until within $1\frac{1}{2}$ cables of the shore at the head. The available width for anchorage in 4 fathoms or more, gradually decreases from 5 cables in the entrance to $1\frac{1}{2}$ cables at $2\frac{1}{2}$ cables from the custom-house ; the length for anchorage in the depths named is about $1\frac{1}{4}$ miles in extent.

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Karam, a village 4 miles north-eastward of Ras Hamra, and 3 miles south-westward of Ras Khanzir, is one of the most important villages of the Haber-Toljaala branch of the western Somális, from its possessing a tolerable anchorage and being about the nearest point to Aden, which bears from it about N. by W. $\frac{5}{8}$ W. 124 miles. What greatly enhances the value of Karam is its being within four days' journey of the country of the Dalbahanta, who, therefore, naturally have a considerable trade through it, though their principal trade is now through Berbera. Karam presents much the same appearance as Anteral, but there are more huts, and in the trading season it is a busy place. A small detachment of Aden police are stationed here to keep order.

The Anchorage is westward of the village in from 4 to 10 fathoms, sandy bottom, at from 3 to 8 cables from the shore, where there is tolerably good shelter from easterly winds. Soundings extend about 3 miles off-shore.

Ras Khanzir, in lat. $10^{\circ} 51\frac{1}{2}'$ N., long. $45^{\circ} 49'$ E., is a low rocky point with sandy beaches on either side; inland is a range of irregular hills of various heights, Tree hill, 1,775 feet high, being 4 miles south of the point. The edge of the bank of soundings, immediately off the Ras, is less than 2 miles distant.

Ghubbet Ankor.—From Ras Khanzir to Ankor, a distance of 25 miles in an E. by S. $\frac{1}{2}$ S. direction, the low sandy coast is slightly concave, forming Ghubbet Ankor. The soundings here are deep, but extend farther off-shore near Ras Khanzir than farther eastward, the edge

* Lieut. W. P. Lodder, H.M.S. *Mariner*, reported in 1888, that the bay westward of Ras Sudda appears to be deeper than as shown on the chart, according to which "when Ras Khanzir is shut in by Ras Sudda you are only $1\frac{1}{2}$ miles from the land, whereas we were actually about 3 miles."

See chart, No. 6b.

of the bank being 5 miles off-shore at 3 miles eastward of Ras Khanzir, affording better anchorage, with sandy bottom, than farther eastward, where, off Ankor, the edge of soundings is only 2 miles distant. Khor Shoreh, a shallow lagoon, is about 4 miles eastward of Ras Khanzir. The shore is generally sandy, with bushes.

Ankor, in long. $46^{\circ} 13' E.$, is another small village on the beach, 2 miles westward of the western point of Ghubbet Raguda; the shore is fringed by reef for about one cable, and there are 10 fathoms close to the reef. Landing is impracticable at low water. At $1\frac{1}{2}$ miles southward of the village is Jebel Marreh, an isolated hill, and 4 miles south-eastward of it is the Sugar-loaf hill, 994 feet high. S. $\frac{1}{2}$ W. nearly 14 miles inland from the village is Ankor peak, 3,700 feet in height.

GHUBBET RAGUDA.—Between the point 2 miles eastward of Ankor and Ras Jilbo, a distance of 47 miles in an E. by N. direction, the coast recedes 7 or 8 miles, forming the bight named Ghubbet Raguda. The shore is low and sandy, with ranges of undulating hills a short distance inland. The bank of soundings off it is narrow throughout, extending only from $1\frac{3}{4}$ to 3 miles off-shore, and the water is very deep. A considerable swell rolls into the bay at times, even in the North-east monsoon, rendering landing dangerous.

Raguda.—In the centre of Ghubbet Raguda, 26 miles eastward of Ankor, and 21 miles westward of Hais, is Raguda village, with several cocoa-nut trees near the one solitary stone house; $8\frac{1}{2}$ miles eastward of it, and 4 miles inland, is Finger peak, with the village of Shelao, at the mouth of the river of that name, fronting it. About 12 miles westward of Raguda is a deep valley named Wadi Nasuja, with a stream of fresh water running through it. There are also several other small streams, which, in rainy weather, discharge themselves into the sea.

Hais.—Hais island is a small rocky island 22 miles eastward of Raguda and about 5 miles from Ras Jilbo; it lies off, and about 400 yards from, Jebel Ret, a bluff point 500 feet in height, with which it is connected by a reef.

Anchorage.—Westward of this reef there is fair shelter from the North-east monsoon, in 5 fathoms water. On the western side of Jebel Ret and close to the beach is the little village of Hais, which is fronted for some distance by a reef, affording shelter within for dhows.

Ras Jilbo, the eastern point of Ghubbet Raguda, is a low sandy point off which the soundings are very deep and only extend half a mile off-shore.

Jebel Warsangali.—At 15 miles S. by W. $\frac{1}{4}$ W. from Ras Jilbo, this high range has its western termination in the lofty Pyramid peak

See chart, No. 6b.

5,170 feet above the level of the sea; and, 11 miles eastward of Pyramid peak, is the highest part of the range, Jebel Surut, 7,150 feet high. From Pyramid peak the range extends eastward parallel with the shore for about 145 miles, for at least half of its extent presenting a ridge of limestone from 6,000 to 7,000 feet high, with no prominent peaks, its summit varying from 20 to 10 miles inland. At both extremes, and towards the lower ranges of hills between it and the sea, the mountain range descends in steps forming in most parts perpendicular precipices from 800 to 1,000 feet high. These mountains abound in frankincense, and produce a little gum-arabic. The climate is described as most invigorating, and the country abounds in large game, the lion being very common in these parts.

Ras Kathib, in lat. $11^{\circ} 3' N.$, long. $47^{\circ} 10' E.$, and about 115 miles eastward of another ras similarly named, lies N.E. by E. $\frac{1}{4}$ E. about 11 miles from Ras Jilbo. About 3 miles eastward of Ras Jilbo is Jebel Máit, 1,300 feet high, which terminates on the shore in a small rocky point; from thence the shore is sandy until within about 4 miles of Ras Kathib, when it becomes cliffy as far as the Ras. The soundings off this part are very deep, affording no safe anchorage.

Máit.—This village, 2 miles north-eastward of Jebel Máit, and nearly midway between Ras Jilbo and Ras Kathib, was the burial-place of a famous sheikh of the name of Isaak, one of the founders of the Somáli nation; see page 370. It stands on a small plain, bounded by the western extreme of the lofty Jebel Warsangali range, which here approaches within 12 miles of the sea.

From Máit is exported a large quantity of the long thin rafter used both at Aden and on the coast in the construction of native houses; the wood is called *mayet*, and the place is named from it. The hills immediately over the town afford a large supply of fine gums, and the place carries on a considerable trade with Aden and Makalla.

The Anchorage off Máit is sheltered from all winds eastward of N.E. by N.

Ras Hambais, a low sandy point 8 miles eastward of Ras Kathib, and the same distance westward of Bander Hashau, may be known by a large single tree on the beach.

MÁIT, Ar-Rabbah, or Burnt island, in lat. $11^{\circ} 13' N.$, long. $47^{\circ} 15' E.$, is a barren rock, 430 feet high, and covered with guano, which is collected and carried in native boats to the Ash-Shehr and Makalla markets. It is about 6 miles off Ras Hambais, the nearest point on the mainland.

A reef, with a least depth of 2 fathoms, projects about one cable from its western extreme. The depths in the channel between the island and the main are irregular, varying from 13 to 26 fathoms, and south-eastward,

from 70 to 90 fathoms. The edge of the 100-fathoms bank extends about 3 miles seaward of the island. The nature of the bottom is chiefly coral, but occasionally sand, or sand and shells.

There is no water on the island except in rainy weather, when it lodges in pools on the summit of the rock, percolates through, and finds its exit close to the water's edge. On the southern side of the island is a remarkable cove or natural dock capable of admitting a vessel of 300 tons by clenching the ends of a cable through holes in the rock.

CURRENT.—During the North-east monsoon a counter-current occasionally sets to the eastward along the African coast, between Burnt island and the 49th meridian, at the rate of from half a mile to $2\frac{1}{4}$ miles an hour.

During the South-west monsoon, an eddy current sets along the African coast to the westward at the rate of about $1\frac{1}{2}$ miles an hour, to near the meridian of Aden.

Bander Hashau, a small village between Ras Hambais and Ras Sorreh, and $6\frac{1}{2}$ miles westward of the latter, stands close to the beach, and is the western boundary of the Warsangali territory; the inhabitants are not always inclined to be civil to strangers. About 3 miles south-eastward of the village is Jebel Burdero, an isolated hill.

RAS SORREH, E. by S. 17 miles from Burnt island, is a low bluff point, from which the coast-line westward to Ras Kathib, a distance of 23 miles, is slightly convex. For 3 miles from Ras Sorreh the coast consists of low cliffs; from thence, in both directions, it becomes low and sandy, and at a short distance from the beach is scantily covered with bushes. A range of undulating hills lies close inland, with occasional spurs from them approaching the sea. Ras Sorreh is the western limit of Ghubbet Kalwait.

The Coast.—From Ras Sorreh, the coast trends S.E. by E. about $11\frac{1}{2}$ miles and then E. by N. for nearly the same distance to a point between which and Ras Sorreh is the bay known as Ghubbet Kalwait, near the head of which is Koshé village. About 9 miles beyond the eastern point of Ghubbet Kalwait is Ras Galweni. The shore is low and sandy the whole of this distance, and thinly covered with bushes at a short distance from the beach. Between the high Warsangali range of mountains and the beach are ranges of undulating hills. The 100-fathoms contour-line is 6 miles from the shore, a short distance eastward of Ras Sorreh, but it soon approaches the land again, and, for the last 17 miles of this portion of the coast, is at an average distance of 3 miles from the shore. The 10-fathoms line is from about 7 cables to one mile off-shore. The general nature of the bottom is sand, coral, and occasionally shells.

Ras Galweni is a low sandy point, to which a spur of the mountain range slopes. The bank of soundings extends a little more than 3 miles from the shore, the 10-fathoms contour-line being about one mile distant, from which it rapidly falls off into 50 and 100 fathoms. The bottom is chiefly sand and coral. The coast between Ras Galweni and Bander Laskhorai is low and sandy, and backed a short distance inland by ranges of undulating hills. At this point the territory of the Sangali Somális terminates.

Ras Lasmaan is a low sandy point 18 miles eastward of Ras Galweni; on it are several small sand-hills and a khor of brackish water, which latter is little more than a swamp. On the western side of the point is Bander Laskhorai, the principal town of the Warsangali tribe, consisting of three forts and two large villages. Here there is a large trade in gums.

The Anchorage off the town is bad, the bottom being rocky, and the soundings irregular; the best berth would probably be found north-westward of the town in from 7 to 10 fathoms, 7 or 8 cables off-shore. Cattle, water, and firewood are procurable at the town. A reef skirts the shore, rendering landing difficult, but there is a passage through it used by the natives.

Tides.—It is high water, full and change, at Bander Laskhorai at 8h. 45m.

Ras Gahm is another low sandy point 9 miles north-eastward of Ras Lasmaan; off it, anchorage depths extend about $1\frac{1}{2}$ miles, but the soundings drop suddenly from 10 to 75 and 100 fathoms. There are several inlets from the sea at the point, in which the water is fresh after rain, and also a large fresh water lagoon. On the western side of the point are three small villages and Bander Gahm fort, from whence gums are exported.

The anchorage directly off these villages is bad, the depth being 12 fathoms close in-shore, and the bottom rocky.

Durduri.—About 9 miles eastward of Ras Gahm and the same distance westward of Ras Adaddo is Ras Dofdilla, a low sandy point, on which is an isolated table hill 600 feet in height. Half way between this point and Ras Adaddo is the village and fort of Durduri, with a fresh water khor close westward of it.

RAS ADADDO, in lat. $11^{\circ} 20' N.$, long. $48^{\circ} 44' E.$, is a rocky point about 300 feet high, at the back of which is a cluster of hills 600 feet in height, between which and the village of Elaiya, 15 miles farther eastward, a black table-land of basalt and volcanic rock about 300 feet in height approaches close to the sea; about a mile westward of Elaiya is a broad stream of fresh water running into the sea, after rains. From Ras

Adaddo westward to Ras Gahm, a distance of $17\frac{1}{2}$ miles, the shore is, as before, generally low, with an occasional hill, and bounded in the interior by the Warsangali range. The depths off this part of the coast are irregular, and the bank of soundings extends from 2 to 4 miles off-shore. There are several khors or lagoons, in which the water is fresh after rain.

Anchorage may generally be found in from 5 to 10 fathoms, close to the shore, but it is indifferent, the bottom being sand and rock.

The Coast from Ras Adaddo trends in an easterly direction for about 39 miles to Ras al Hamar; it is slightly concave, forming a bay generally low with occasional hills, and backed by the high Warsangali range, previously described, an enormous ridge of limestone averaging 6,500 feet in height, and perfectly level along the summit. The range has its eastern limit about S. by W. 20 miles from Ras al Hamar and extends from thence westward without a break as far as Máit. The soundings on this portion of the coast are regular, but deep; the 10-fathoms contour-line is from half a mile to one mile from the shore, and the edge of the bank of soundings is from $1\frac{1}{2}$ to 4 miles, being very steep; the soundings, in some parts falling rapidly from 20 to 100 fathoms. The bottom is rocky close in-shore; sand, and sand and shells farther out.

Bander Zaida or Kao.—A small town and fort 19 miles eastward of Ras Adaddo, and 12 miles westward of Bander Kasim, is the boundary of the Warsangali and Mijertein tribes. The 10-fathoms line is nearly one mile from the shore at this place; the soundings then rapidly increase to 100 fathoms. Anchorage is indifferent, the bottom being sand and rock.

The British protectorate of this coast ends at Bander Zaida. *See* page 368.

As already stated, the coast in this vicinity is backed by a low broken ridge of hills. At $3\frac{1}{2}$ miles eastward of the town is a stream of water, fresh in the rainy season, and navigable for boats for about 3 miles; and, both eastward and westward of the town are small streams after heavy rain.

Inhabitants.—The Sangali Somáli or Warsangali tribe, who inhabit the coast from Bander Hashan to Bander Zaida, are divided into several clans, *see* page 370; they are a powerful and warlike people, but are friendly and obliging to strangers. Their country is the plateau of limestone mountains already described, precipitous on their northern side, but sloping gradually to the South, together with the undulating ranges, intersected by ravines, and thickly wooded between the mountains and the sea, and also the plains on the southern slope of the mountains. The belt of level

See chart, No. 100b.

ground near the sea is thinly sprinkled with bushes growing on a plain of white sand.

Frankincense, myrrh, sumuk or gum-arabic, sheneh (orchil), and ghi, form the export of this tribe; and a peculiar kind of gum, called felleh-felleh, which is shipped to Aden in large quantities from the coast.

BANDER KASIM, a town and anchorage 12 miles eastward of Bander Zaida and $7\frac{1}{2}$ miles westward of Ras al Hamar, consists of about 100 huts and 5 forts. It is the principal town of the Mijertein Somálias and has a large trade in gums, &c. At $1\frac{1}{2}$ miles westward of the town is the bed of a broad stream, which, after heavy rains, discharges a large quantity of water into the sea.

Anchorage.—A coral bank, dry at low water, extends half a mile off the town; outside of it is moderately good anchorage with off-shore winds, in from 6 to 8 fathoms, sand.

Supplies.—There are wells in all the forts, from which good water may be obtained; sheep and firewood are procurable.

Ras al Hamar, in long. $49^{\circ} 22' E.$, is a prominent sharp rocky point about 300 feet high, and is the north-western termination of a range of hills close to the shore, about 9 miles long and with heights varying from 800 to 1,500 feet. Depths of 4 and 5 fathoms will be found nearly one mile northward and north-westward of the point, with from 8 to 10 fathoms beyond that distance. On the western side of the point is Khor Maraio, an inlet into which a stream of fresh water runs after heavy rains. The bed of this stream is dry in the dry season, but water is always procurable by digging.

See chart, No. 1006.

CHAPTER X.

RAS AL HAMAR TO RAS HAFUN.—SOKÓTRA AND
ADJACENT ISLANDS.

(Lat. 10° 20' N. to lat. 12° 45' N.; long. 49° 22' E. to long. 54° 30' E.)

VARIATION IN 1900.

Ras al Hamar - 2° 10' W. | Sokótra - - 1° 40' W.

The coast.—From Ras al Hamar, described in the preceding chapter, the coast trends E. by N. $\frac{3}{4}$ N. about 16 miles to Ras Hantara, the slight indentation between them being divided into two bays by the rocky point Ras Aburgaba. The shore between is sandy and backed by a range of hills from 800 to 1,500 feet in height, but near Ras Hantara they rise to a much greater height in the Jebel Hantara range. Just westward of Ras Aburgaba are two small villages, and Bander Baad fort, at which sheep and water are procurable. With the exception of a small 2-fathoms bank half a mile northward of the western village, the soundings are regular and there are no dangers; the depths increase off-shore gradually to 20 fathoms sand, from which they rapidly deepen. Between the villages and Ras Aburgaba there is good anchorage in 9 or 10 fathoms, from $1\frac{1}{2}$ to $1\frac{1}{2}$ miles off-shore, but there is no protection from any but off-shore winds.

Ras Hantara, a high rocky cape, is the termination of Jebel Hantara, a range of lofty table mountains thickly covered with the frankincense tree, and 5,000 feet above the sea; the shore between Ras Hantara and Ras Korai, 9 miles further eastward, is sandy and covered with bushes, with depths of 20 fathoms and less extending about 2 miles off-shore.

Ras Korai is another high rocky cape, the termination of a similar range of lofty table mountains, stretching away in an E.S.E. direction, and rising to a height of 4,600 feet above the level of the sea; the sides of these mountains are clothed with large frankincense trees. On the western side of the cape is Boreh village and fort. The soundings off the cape are deep, and the 100-fathoms contour-line is only one mile distant from the shore.

See chart, No. 1006.

The coast from Ras Korai to Bander Maráyeh, a distance of 45 miles, trends E. by N. $\frac{1}{4}$ N. and is slightly concave, with small projecting rocky points and bays between them. The shore is bold, there being no shallow water except off Bander Khor, where a bank of from one to 3 fathoms extends nearly one mile from the shore. The 100-fathoms line of soundings varies in distance from 2 to 6 miles from the shore, with a sandy bottom.

Between Ras Korai and Bander Khor, Jebel Haismut rises 3,800 feet above the sea, only a mile or two inland; and, about 8 miles eastward of the Khor, commences a ridge of limestone mountains from 1,500 to 3,000 feet in height, closely bordering the sea coast, and terminating eastward in Jebel Maráyeh, presently described, of which these mountains may be considered the western branch.

BANDER KHOR, in long. $49^{\circ} 47' E.$, is 12 miles eastward of Ras Korai. A bank of from one to 3 fathoms extends off the mouth of the river for nearly a mile, outside of which there is good anchorage in from 6 to 10 fathoms, with off-shore winds.

The town is 4 miles from the sea on the banks of the river, the mouth of which is dry at low water but is navigable for small boats up to the town at high water. During the rainy season, the river discharges a quantity of water; the entrance may be known by a low white sand-hill about a mile eastward of it and close to the beach, and by its being between two high ranges of mountains. The land one mile inshore is tabular and about 400 feet above the sea. On the western side of the entrance is a small village and fort, and 2 miles south-westward of the fort are some ruins and a small lagoon.

A considerable trade is carried on here in gums, which trade, as at Bander Maráyeh, to the eastward, is chiefly enjoyed by Banyan traders. Here, as at all the towns on the coast, sheep, firewood, and water are to be procured.

About 23 miles eastward of Bander Khor is the small rocky point Ras Durbo, scarcely distinguishable from any other part of the coast, and 3 miles eastward of it is the village and port of Durbo. About 7 miles farther eastward is the village of Bander Maráyeh.

BANDER MARÁYEH, in lat. $11^{\circ} 43' N.$, long. $50^{\circ} 28' E.$, is the principal village on this part of the coast, but it is almost deserted in the hot season. A considerable trade in gums is carried on from here about September, principally by Banyan traders. It is close to the beach and is defended by five forts. From a distance, it may be found by steering for Jebel Maráyeh, which is easily distinguished by its hummock shape; though there is another conspicuous barn-shaped peak 18 miles westward of Jebel Maráyeh, which might be mistaken for it by a vessel to the westward of her reckoning. The town lies at the base of Jebel Maráyeh

and rather eastward of it, or more immediately at the foot of a red precipitous hill about 900 feet high, which has a large natural hole through it close to its summit. North-eastward of the town is a mangrove swamp, and the bed of a watercourse.

Anchorage off the town is good, in from 5 to 10 fathoms, sand, with the Mosque bearing about S.S.E. $\frac{1}{2}$ E., and from 5 to 8 cables off-shore. The soundings increase gradually to 20 fathoms at $1\frac{1}{2}$ mile from the beach, after which they become irregular with overfalls.

Supplies.—Good water may be obtained from a well 2 miles inland; cattle and firewood are generally procurable in abundance.

Jebel Maráyeh, a mountain peak 4,000 feet in height, lies S.S.W. about 3 miles from the town, being the spur of a noble range of limestone mountains, covered with frankincense trees, which extends inland in an E. by S. direction, and attains a height of 5,000 feet; as previously described, a branch of the same range also extends westward along the coast from Jebel Maráyeh for about 23 miles, varying in height from 1,500 to 3,000 feet.

From Bander Maráyeh, the coast trends about N.N.E. $\frac{1}{2}$ E., 12 miles nearly, to the western sandy point of Filuk. Within this space are the two small villages Galeh and Gahseli, close to the beach, each with forts, but having bad anchorage off them. About 3 miles beyond the last named is Bander Filuk.

Bander Filuk is a small fort and village close to the beach, about 7 miles north-eastward of Bander Maráyeh and 5 miles southward of the sandy point of Filuk. Immediately northward of the village is the entrance to Khor Filuk, a lagoon about 10 miles in length and full of mangrove bushes, with only a low narrow ridge of sand between it and the sea.

Anchorage.—The anchorage off Bander Filuk is in 6 or 7 fathoms with the fort bearing East; a good scope of cable is necessary to prevent dragging the anchor off into deep water into which the bank suddenly falls at 4 or 5 cables from the beach.

The low sandy point of Filuk is about 6 miles S.W. by W. from Ras Filuk proper; off it, there is a depth of 5 fathoms at one mile from the shore, and a coral bank of 20 fathoms and less extends nearly 2 miles off-shore. This low point is sometimes called Ras Filuk, and the ancients gave the name of Mons Elephas to the collective headland of which Ras Alula is the most prominent point.

RAS FILUK, or more properly Ras-al-Fil, and also the Mons Elephas of the Romans, so called from its resemblance in shape to an Elephant, is a prominent hill 800 feet above the level of the sea, 8 miles westward of Ras Alula, and, whether viewed from eastward or westward, it has the appearance of an island, the land about it being low. It is

See chart, No. 100a.

generally called by the natives Ras Belmúk, and may be seen at a distance of 40 miles in clear weather. The water is deep off it, there being 18 and 20 fathoms within a quarter of a mile. In the valley, on its eastern side, is a lagoon of salt water and the bed of a watercourse.

Anchorage.—Close westward of Ras Filuk is a small but deep bay, affording shelter from easterly or southerly winds with good anchorage in 5 fathoms water, with the point bearing N.E. by E. 6 cables. From this position, the soundings are regular towards the point, but, to the southward, reefs extend some distance off-shore. The depths are from 8 to 10 fathoms a little farther out.

RAS ALULA is a low, sandy, but prominent cape, lying E. by N. $\frac{1}{4}$ N. $8\frac{1}{2}$ miles from Ras Filuk, the shore between the two being low and sandy; just westward of it is the narrow entrance to Khor Galweni or Great lake, an extensive lagoon covered with mangrove bushes nearly over its whole extent. Boats can enter the lagoon at all times of tide, but large dhows must wait for high water. A river falls into the khor at its southern extreme, which, during the rainy season, must be very deep, the bed being 250 feet in depth by 900 feet in width. In the dry season, the river is navigable for boats 3 or 4 miles from the sea, and farther inland there are pools of fresh water in its bed. The plain from Ras Alula gradually ascends until it reaches the high range of mountains in the interior.

Bander Aiula, a small village and anchorage, lies about $1\frac{1}{2}$ miles westward of Ras Alula. The village consists of about 200 houses, of which three are of stone, the largest being occupied by the Sheikh. The water at the village is bad, but cattle, except after periods of drought, and abundance of firewood are procurable. Quantities of fish may be taken with the seine on the western side of the spit; sharks are numerous.

Trade.—Alula exports gum arabic, incense, myrrh, dried hides, ostrich feathers, ivory, pearls, sponges, &c. Imports cotton and silk stuffs, rice, sugar, tea, &c. The trade is carried on through Aden.

It is stated by the natives that coal exists some few days' journey up country from Alula.

Anchorage.—There is anchorage, sheltered from easterly winds, in about 9 fathoms on the edge of the coral ledge, at 3 to 4 cables from the shore, with the Sheikh's flagstaff bearing S.E. and Ras Galweni, the western point of entrance to the khor, N.E. by E. $\frac{1}{4}$ E. Landing is apparently easy.

Tides.—It is high water, full and change, at Alula, at 6h. 45m.; springs rise 6 feet.

The Coast.—From Ras Alula, Ras Asir bears E. by S. $\frac{3}{4}$ S. 30 miles, the coast throughout trending almost in a straight line, though there are a few slightly projecting rocky points forming small bays between, but no

dangers exist. The soundings increase rapidly in depth from 10 fathoms to the 100-fathoms contour-line at the edge of the bank off Ras Alula, from which it is distant less than 2 miles; this contour-line is distant $6\frac{1}{2}$ miles off Ras Boleh, and closes again to about $2\frac{1}{2}$ miles due North of Ras Asir.

When 7 or 8 miles eastward of Ras Alula, the mountains, from 1,800 to 1,600 feet in height, generally approach closely to the sea, with the exception of two or three intervening spaces where the shore is sandy and covered with bushes. Throughout this extent of coast there appear to be no villages. At Moya Boleh, about 6 miles eastward of Ras Alula, and which may be distinguished by its date palms, is a lagoon and several wells of excellent water about 100 yards from the beach; water in any quantity can be obtained by digging holes in the sand near the wells to a depth of 3 or 4 feet. At Baraida, half way between Ras Alula and Ras Asir, is a lagoon of salt water on the sandy plain near the sea.

RAS ASIR or CAPE GUARDAFUI, in lat. $11^{\circ} 50\frac{1}{2}'$ N., long. $51^{\circ} 16'$ E., the north-eastern point of Africa, is a precipitous rocky cape 780 feet in height, of a whitish-brown colour, and when seen from the south-eastward appears with a moderate slope towards the sea; the land westward of Ras Asir is a level ridge, the sand-hill 3 miles distant from it being apparently the end of it. This sand-hill is in no way remarkable when seen from the south-eastward, being but little above the ridge. About 3 miles farther westward is a steep bluff, forming the eastern extreme of a range of hills facing the North coast, and not far back from it; see views on charts No. 6a, and No. 100a. The cape is frequently enveloped in thick haze, rendering it deceptive in estimating its distance. Approaching from the north-eastward, Ras Asir may be known by the light-coloured sand on the top and by the sandy bay westward of it. The cape is steep-to, with 12 fathoms water close in-shore, and soundings extending 18 miles eastward, there being about 100 fathoms at that distance; northward of Ras Asir, as already stated, the bank of soundings extends only $2\frac{1}{2}$ miles.

Current.—Great care is necessary in making Ras Asir from the southward during the South-west monsoon, the current setting up the coast strongly to the northward, and turning close round the cape to the westward; but, at a short distance from it, continuing its course to the northward and eastward. See directions for approaching Ras Asir with remarks on currents, sea temperature, soundings, &c., at pages 12, 22, 25, 37, and 38.

Tides.—It is high water, full and change, at Ras Asir, at about 6h. 15m.; springs rise 6 feet, neaps, $4\frac{1}{2}$ feet.

Anchorage.—In the bay immediately westward of Ras Asir is good anchorage and protection from southerly winds in from 8 to 10 fathoms,

See chart, No. 100a.

with Ras Asir bearing about E. $\frac{3}{4}$ S., and the sand-hill from S.W. by W. to S.S.E.; farther westward, the ground is said to be rocky. The sand-hill in line with the western extreme of a range of hills bearing about S.W. by W. leads to anchorage in $4\frac{1}{2}$ fathoms; H.M.S. *Briton* anchored on this line with Ras Asir bearing E. $\frac{3}{4}$ S., and found the holding ground (fine sand) excellent, when exposed to hard squalls off the land.

Supplies.—Turtle may be obtained from the natives at this anchorage; bullocks and small sheep, brought from Wadi Tuhom, may also be purchased. Fish are plentiful and good; the best place to haul the seine is off the little Somáli village near the beach in a small bay. Water is not to be obtained.

The Coast.—From Ras Asir, the extreme eastern point of Ras Hafun bears S. $\frac{1}{8}$ E. 84 miles; the intervening points, Ras Jard Hafun and Ras Ali Bash Kil, lying respectively $2\frac{3}{4}$ miles and $9\frac{1}{2}$ miles westward of this line; the former at $10\frac{1}{2}$ miles, and the latter at 42 miles southward of Ras Asir, or about half way between it and Ras Hafun. The 100-fathoms contour-line of soundings lies nearly 30 miles from the land eastward of Ras Jard Hafun; from thence southward it closes in towards the shore until off Ras Ali Bash Kil it is only 11 miles distant, and from 11 to 13 miles off Ras Hafun. The water everywhere shoals gradually towards the shore, though off each of the principal points depths of from 20 to 10 fathoms will be found very close in. Full particulars of the precautions necessary in the approach to and navigation of this coast will be found at pages 37 and 38 of this work.

Wadi Tuhom is a fertile valley 6 miles southward of Ras Asir, full of large mimosa trees, and with a stream of water running through it. From near Ras Asir, the shore is sandy all the way to Wadi Tuhom with the exception of a small cliff about midway. Near the entrance of the stream, which is apparently blocked up in the dry season, are numerous habitations, and a cliff about 160 feet in height extends nearly one mile southward from it, beyond which the shore is again sandy to Ras Jard Hafun.

RAS JARD HAFUN or SHENARIF bears S. by W. $\frac{1}{4}$ W. $10\frac{1}{2}$ miles from Ras Asir and is the north-eastern extreme of Jebel Guraleh, the bluff termination of lofty table land 2,900 feet in height. This table land on its seaward face falls precipitously for about 400 feet, and immediately over the cape the ground from the foot of the precipice is much broken in its slope to the sea, with deeply-scored sides and some remarkably formed rocks. The cape itself is rounded, rocky, and bold, there being from 10 to 16 fathoms water close to. It is in appearance a remarkably bold and rugged headland, especially when seen from the south-eastward. The land about it and to the southward is dark, and

in great contrast with the whitish-brown colour of that between it and Ras Asir.

From Ras Jard Hafun northward, the high table land of which it is the extreme takes a north-westerly direction for about 6 miles, at which distance there is a deep ravine, with a sharp-peaked hill 2,760 feet in height northward of it. Between this peak and Ras Asir, the hills recede still farther from the coast, the space between being occupied by an undulating light coloured ground resembling hard sand, and rising in a gradual slope from the sea. It is this receding of the high land, combined with the light colour of the slope intervening between it and Ras Asir, that causes the difficulty of making out any land northward of Ras Jard Hafun at night, and which has led to so many disasters.

Quoin peak, 3,000 feet high, about 11 miles south-westward of Ras Jard Hafun, and 3 miles inland, is a conspicuous mark from the southward; its bluff is on its north-eastern side, and it may be seen at a great distance in clear weather. There is also a rounded sand-hill near the shore, about 17 miles southward of Ras Jard Hafun, with a considerable tract of sand extending northward of it and well up the hills at the back, which is also a good mark, being the only white sand in this neighbourhood. From Ras Jard Hafun, and including Quoin peak, the Jebel Guraleh range stretches away in a south-westerly direction, and attains a height of 5,000 feet.

At 12 miles southward of Ras Jard Hafun, and close to the beach S.S.E. 4 miles from Quoin peak, is Khor Abdibán, a salt water lagoon, with fresh water in the upper part, where it is fed by a stream running down the valley.

Ghubbet Binna.—From Ras Jard Hafun, the trend of the shore is S.S.W. until within 7 or 8 miles of Ras Ali Bash Kil when it curves abruptly out eastward to that Ras, forming on its northern side the bay known as Ghubbet Binna. The shore in the southern part of the bay is low, sandy, and thinly covered with bushes, but on the western side is a range of limestone table mountains 2,700 feet above the sea, their summits only 4 miles distant from it, and descending to the plain in steep precipices intersected by fertile valleys. North-westward of this range is the still higher range Jebel Guraleh, already described.

The soundings in the bay are regular and there are no hidden dangers, the depths increasing gradually from the shore to 20 fathoms at from 2 to 5 miles distance from it, the general nature of the bottom being sand and shells off-shore and rock close in.

Anchorage.—There is good anchorage in not less than 7 fathoms and shelter from southerly winds off the small village in the southern part of the bay, where it is not subject to heavy squalls from the high land.

RAS ALI BASH KIL is a prominent bluff headland rising as a steep cliff 400 feet above the level of the sea, with a depth of 20 fathoms at one mile off shore. Immediately westward of it is Khor Binna, an extensive salt water lagoon with the village before mentioned close to its western end.

Between Ras Ali Bash Kil and Ras Hafun, the shore of the bay is low, sandy, and thickly covered with bushes, and bounded 3 or 4 miles in the interior, by the range of flat table hills about 700 feet in height, of which Ras Ali Bash Kil is the north-eastern termination.

The soundings in the bay are regular and shoal gradually towards the shore; the 10-fathoms contour-line, which is only 2 or 3 cables from the shore off Ras Ali Bash Kil, gradually increases its distance until it is 4 miles from the shore in Hafun North bay. The edge of the bank or 100-fathoms contour-line is from 10 to 12 miles distant from the shore. The general nature of the bottom is grey sand and shells.

Water.—There appears to be a plentiful supply of water in this bay. About 10 miles southward of Ras Ali Bash Kil is the Wadi Jambokh, a valley through the flat table land described, where inhabitants are numerous and there is plenty of fresh water. At Dehgubo, 12 miles southward of Wadi Jambokh, there is a well of good water; and 7 or 8 miles farther south is Handeh, a salt lagoon, except at the head where it is fresh but barely drinkable; there is, however, a well of good water a few yards higher up.

RAS HAFUN, or "The Surrounded," is a peninsula and prominent headland, 8 miles wide north and south and 12 miles long east and west, from 400 to 600 feet in height, rising in steep cliffs from the sea, and formed of sandstone and limestone. The eastern extreme of the peninsula is perfectly flat, and the interior consists of undulating hills, deeply intersected by ravines and watercourses. The south-western point of the promontory of Hafun is high and flat, like a barn, whence it is called Barn hill; at a distance it appears separated from the rest of the peninsula, the land between being low.

Ras Hafun is connected with the mainland by a long narrow neck of white sand, shells, and mud, with a few stunted bushes thinly scattered along it, and from its being almost an island, probably takes its name of Hafun. On either side of the narrow neck of sand there is formed a deep bay, with good anchorage according to the season. The peninsula is in the Mijertein territory and tenanted by the Aial Fatha branch of the Othman family; there are only a few miserable huts and a population of probably 50 persons; they are friendly to strangers and may be trusted. The water in the wells is bad. Cattle and firewood are procurable.

Hafun North bay is clear of danger, and affords anchorage during the South-west monsoon in from 7 to 10 fathoms, hard sand, but the holding ground is not very good. Near the north-western extreme of the peninsula, the shore must not be approached by large vessels within 3 miles, as depths of from 3 to 4 fathoms extend nearly that distance from the shore.

The soundings elsewhere in the bay are regular and increase gradually from 4 to 6 fathoms close in, to 38 and 40 fathoms 11 miles off-shore; the bottom is hard white sand. There is shelter in this bay from southerly winds, but it is doubtful whether a vessel could ride in safety in the full strength of the South-west monsoon, owing to the heavy swell that must roll round the point, and the violent gusts of wind blowing across the headland. These gusts render it necessary to be ready to shorten sail when standing close along the land past the cape or when coming to an anchor under it.*

Large quantities of fish may be caught by hook and line in this bay.

Khor Hurdia, on the northern side of the isthmus of Hafun, is an extensive harbour, $2\frac{1}{2}$ miles wide at its entrance, and 12 miles in length to its head. As an anchorage it is available for boats only, the depth inside being but one to $1\frac{1}{2}$ fathoms. This locality is probably the most unhealthy spot on the Somali coast, its shores and the bottom being covered with decomposed vegetable matter; yet there are many fishermen living on the sea-shore. There is no fresh water here, but it is said by the natives that at Khor Hashera, at its head, a stream of fresh water runs into it.

Trade.—During the South-west monsoon, a kind of fair is held annually at Khor Hurdia. The merchants from Makalla, Shehr, and from the Mijertein harbours to the northward and westward, attend this meeting at the end of May, when their dhows are hauled up on the beach and a brisk trade is carried on throughout the South-west monsoon in gums, ostrich feathers, hides, ivory, and ghi; large quantities of ambergris are also brought for sale.

Hafun South bay is best adapted for vessels during the North-east monsoon, but a change of two or three points in the direction of the wind causes a swell to roll in and a surf to break on the beach. The bay is much frequented by shark fishers from the Arabian coast, many of whom reside here throughout the year, merely moving their fishing-boats to the other side of the isthmus as the monsoon changes.

The depths in the southern bay are regular, decreasing gradually towards the shore, with the exception of a 3-fathoms patch of sand situated about

* H.M.S. *Forte*, in May 1871, during a moderate gale from the southward, was anchored in $7\frac{1}{4}$ fathoms, with North-west cape bearing West, and dragged with 70 fathoms of cable out. H.M.S. *Nimble*, at anchor 3 cables S.S.E. from the *Forte*, also drifted with 60 fathoms of cable out.

See chart, No. 100a.

7 cables off the north shore, with the west extreme of the table land N.W. $\frac{1}{2}$ W. The depths are greater to the westward than towards the peninsula, where the best anchorage is in 6 or 7 fathoms, sand, at from one to $1\frac{1}{2}$ miles from the shore, with the south-western point of the peninsula bearing about S.E. On the south-eastern and eastern sides of the peninsula there are depths of from 15 to 20 fathoms water close in to the cliffs, increasing to 100 fathoms at about 13 miles from the cape. The nature of the bottom is sand and rock.

Tides.—It is high water, full and change, at Hafun, at 6h. 15m.; springs rise 4 feet.

For the continuation of the African coast to the southward, *see* African Pilot, Part III.

ISLANDS EASTWARD OF RAS ASIR.

ABD-AL-KURI is a narrow island midway between Ras Asir and the western end of Sokótra, and is 20 miles in length East and West, by nearly $3\frac{1}{2}$ miles in width. It consists of two ranges of hills which occupy the whole length of the island, but being separated near the centre, they give it the appearance of two islands when seen from a distance. The eastern range is elevated 1,670 feet, at its western extreme, while the western range is but 790 feet in height. The northern shore is chiefly a sandy beach, with a few rocky points; the southern side consists of cliffs rising abruptly from the sea. The bank of soundings extends from one to 3 miles northward, and 4 miles southward of the island. The inhabitants are few and miserably poor, subsisting chiefly on shell-fish caught in the clefts of the rocks on the sea-shore; they have no boats, and are seldom visited by strangers. The island is destitute of cultivation, and the water is indifferent.

Ras Khaisat-en-naum, the western extreme of the island, bears E.N.E. 53 miles from Ras Asir; it consists of two sharp rocky points, half a mile distant from each other. From the northern point, a reef of rocks extends West one mile, with 5 fathoms close to and from 25 to 35 fathoms half a mile distant.

During the survey of this locality by H.M.S. *Fawn* in May 1877, the current was observed setting N.N.E. at from half a knot to $1\frac{1}{2}$ knots an hour, and numerous tide rips were seen in the vicinity of the shoal water.

Caution.—Off the western end of Abd-al-Kuri island, owing to the higher hills being some distance inland, it is difficult to estimate correctly the distance from the shore. This fact should be borne in mind, especially at night, when, to ensure passing the western end of this island at a prudent distance of not less than 2 miles, the water should not be shoaled to less than 40 fathoms.

About 9 miles W.N.W. of Ras Khaisat-en-naum is a coral bank with from 24 to 40 fathoms water, and deep soundings of from 60 to 180 fathoms all round. In mid-channel between the island and Ras Asir, soundings have been obtained in 528 and 428 fathoms.

The South Coast.—From Ras Khaisat-en-naum, the southern coast of the island trends eastward 10 miles to Bander Saleh, rising in cliffs abruptly from the sea, and forming several points, of which Ras Hattan is a projecting bluff point $2\frac{3}{4}$ miles distant from the western end. About $3\frac{1}{2}$ miles from Ras Hattan is a rocky islet close to the shore, between which and the shore is a small bay full of sunken rocks. On this portion of the coast the water is deep, there being from 18 to 20 fathoms close to the cliffs, increasing to 100 fathoms 4 miles off-shore.

Bander Saleh, or Leven bay, is on the southern side of the island, immediately westward of the extreme of the highest mountain. It affords good anchorage during the North-east monsoon in from 6 to 10 fathoms, coral bottom, from $2\frac{1}{2}$ to 5 cables from the shore. There are a few huts and a well of indifferent water a short distance from the beach, but no supplies are to be procured. This is the narrowest part of the island, it being only one mile across, and consisting of moderately high sand-hills.

From Ras Labaineh, the south-eastern point of the bay, to the south-eastern extreme of the island, the coast consists of steep cliffs, with from 10 to 12 fathoms water close to. The south-eastern point itself is low and rocky, the mountain range sloping off to it. Off the point are three small rocks, and between this point and Ras Anjara is a bay about $1\frac{1}{2}$ miles wide with a sandy beach, and with depths of from 6 to 10 fathoms nearly a mile from the shore.

Ras Anjara, the north-eastern point of the island, is a rocky point with a sand-hill. About 3 cables southward of it, in the bay just described, is a rocky islet. North-eastward of Ras Anjara is Bacchus bank extending about 3 miles, with depths varying from 4 to 12 fathoms, and deepening rapidly to the northward; a strong ripple is created on this bank when the tide is against the wind. The width of the channel between the eastern end of Abd-al-Kuri and the western end of Samha, the westernmost of the Brothers islands, is 35 miles; there is no danger in it except the Bacchus bank just mentioned.

The North Coast.—The northern shore from Ras Anjara westward to Ras Teram, a distance of 7 miles, is low and sandy, and forms Bander Lon, a bay in which are a few huts and a well of indifferent water; the shore near the well is fronted by some sunken rocks close in. From Ras Teram to Ras Haimera, a small rocky point 6 miles farther westward, the shore consists of small rocky points with sandy beaches intervening; about 2 miles eastward of the latter point is a sunken rock close to the shore.

See chart, No. 6a.

From Ras Haimera, the coast trends irregularly for 7 miles to the western extreme of the island.

The anchorage along the northern shore is said to be indifferent, but H.M.S. *Briton*, in August, anchored in 9 fathoms, sand, with Ras Haimera S.E., and 790-foot peak S.W. $\frac{3}{4}$ W., with good holding ground.

KAAL FIRAON, or FARUN ROCKS, about three quarters of a mile in length by 200 or 300 yards in width, are two rocky islets steep-to and divided from each other by a narrow channel filled with sunken rocks; they bear N.N.E. 13 miles from the western end of Abd-al-Kuri, and are on the northern side of a large bank of soundings 10 miles in length. The eastern and larger rock has one peak 282 feet high and two smaller ones. The western rock has also one peak of about the same height and one smaller one. Thus, from different points of view they show several peaks and are completely covered with guano, which gives them a snow-white appearance; their only occupants are birds, which flock here in great numbers. These rocks are visible in clear weather about 20 miles; but, at night, they are difficult to distinguish owing to their colour.

Tides.—Through all the channels between the islands westward of Sokótra, the flood sets northward and the ebb southward, but the tides are much influenced by the current of the prevailing monsoon; when not so influenced, it is said that they run from one to 2 miles an hour. At Kaal Firaon it is high water, full and change, at 8h. 20m.; springs rise 6 feet.

The BROTHERS are two islands lying on an E. $\frac{1}{2}$ S. bearing from Abd-al-Kuri and south-westward of Sokótra, and on the same plateau of soundings as the latter. They are named Jezirat Samha and Jezirat Darsa. Depths of from 15 to 20 fathoms extend eastward of these islands for about 35 miles, but this part has not been thoroughly examined. In the channel, 9 miles wide, between the Brothers, there is no danger, the soundings varying between 20 and 25 fathoms, sand and shells, with occasional patches of coral. The 100-fathoms contour-line is close to the northern side of Samha and less than 4 miles northward of Darsa, but southward of the islands it is 17 or 18 miles distant, and westward of Samha it is about 30 miles distant.

Samha, the westernmost of the Brothers, is $6\frac{1}{2}$ miles in length by 3 miles in breadth near its eastern end, but narrowing to a point at its western end. It consists of a small hill near its western extreme, and of a table mountain for nearly half its length, the highest part of which, near the centre and towards the southern shore, is 2,440 feet above the sea; its northern extreme terminates in a well-defined bluff. The

shores are rocky, and the southern side rises in perpendicular cliffs from the sea.

A reef extends half a mile off the western point, and another half a mile from the north-eastern point, and there are two rocky islets off the south-eastern side. About $1\frac{1}{2}$ miles E. by N. from the north-eastern point is a small bank of 13 fathoms. On the southern side, the bank of soundings extends 17 miles; and, westward, to Abd-al-Kuri, increasing midway to 145 fathoms and decreasing again towards the latter island.

Occasionally, during the fine season, some people from Sokótra visit Samha for the purpose of fishing, catching turtle, and collecting ambergris. Water runs from the mountain in small quantities all the year round.

Darsa, the eastern island, bears E. by S. 9 miles from Samba and is $3\frac{1}{2}$ miles in length by one mile in width, and 1,500 feet high, with an even table top the whole length of the island rising perpendicularly from the sea, except on the northern side, where the North point of the island projects about $3\frac{1}{2}$ cables from the base of the hill. The eastern extreme of the island bears nearly due South 26 miles from Ras Shoab, the western point of Sokótra. On the northern side of the island, a bank extends about $1\frac{1}{4}$ miles, at which distance there are 13 fathoms water, the depth from thence decreasing gradually to the shore.

SOKÓTRA ISLAND, distant about 130 miles from Ras Asir, 190 miles from the Arabian coast, and 500 miles from Aden, was formerly under the nominal government of the Sultan of Kishin, on the Arabian coast; it was placed under British protection by treaty with that Sultan on 23rd April 1886, and on 30th October of that year, the British flag was hoisted at Tamrida, the capital, situated on the seashore on the Hadibo plain on the northern side of the island. The Sultan of Sokótra has a residence on the Gharriah plain, at the base of Jebel Haggier, and another in Tamrida.

Situated on the highway of the traffic to the East, this island is almost invariably sighted by steamers bound to or from the gulf of Aden, but being exposed to both monsoons, with uncertain currents, and having no harbours in which vessels can at all times ride safely at anchor, coupled with the unfavourable character the natives have hitherto borne, Sokótra has been but little visited.

The island rises to its extreme height of 4,656 feet in Jebel Haggier, 4 miles southward of Tamrida. It is 70 miles in length in an East and West direction by about 18 in width, and with a coast line of about 180 miles.

On the southern side, the shore preserves nearly an unbroken line, but on the northern and western sides it is broken into a succession of small

bays, with streams at their head, affording anchorage according to the season; but not one of them is safe at all times of the year. Over a wide area the hills rise with considerable abruptness in bold perpendicular cliffs several hundred feet in height, but at other places they leave plains, varying in breadth to as much as 5 miles between the base of the hills and the shore. On the southern side is the Naukad plain, the largest of these, which, extending nearly the whole length of the island, is for miles covered with dunes of drift sand. The southern side, though considerably less fertile than the northern, is, towards Ras Momi near the eastern end, tolerably productive; but, westward, it is as arid and barren as the worst parts of Arabia. On the northern side, these plains occur chiefly at the mouths of streams, and are the sites of the only places which may be called towns. The internal hilly part of the island may be roughly described as wide, undulating, and intersected limestone plateaux of an average height of 1,000 feet, which flank on the West, South, and East, a nucleus of granite peaks over 4,000 feet in height. These are seldom free from cloud, but when the weather is clear their appearance is broken and picturesque.

The whole of this hilly region is deeply intersected by ravines and valleys, which, in the rainy season, are occupied by roaring torrents, but the majority are empty in the dry season; there are, however, many perennial streams, especially in the central regions, though but few reach the shore in the dry season. The eastern end of the island is the most destitute of water. As a general remark, it may be observed that in the North-east monsoon, nothing presents a stronger contrast than the eastern and western ends of the island; while the former is destitute of verdure, has scanty pasturage, and, with the exception of some places near the sea, has no water other than that which is retained in natural reservoirs, the latter is supplied with frequent streams, its valleys and plains afford luxuriant grass, herds of cattle are numerous, and the scenery in many places is equal to that of our own country.

In the plain about Tamrida, and some parts near Kadhup, are several beautiful valleys, with a soil well adapted for the cultivation of grain, fruit, and vegetables. In the valleys, through which the streams flow, not only are there extensive groves of date trees, but a broad border of beautiful turf, with occasional enclosures of jowari (millet), and, rarely, a plantation of indigo or cotton, indicate no want of fertility in the soil.

Climate.—Though Sokótra is but a short distance from the continent of Africa and from Arabia, yet, from both monsoons blowing over a vast expanse of water, it enjoys a remarkably temperate and cool climate as compared with them. The mean daily temperature on the plain in the North-east monsoon is about 70° , but in the South-west monsoon it is as much as 86° ; on the plateau the temperature at night often falls to about 50° . The island has two wet seasons—June to August, and

November to January. The climate on the hills is very healthy, but on the plains, especially at the change of the monsoons, fever is prevalent.

Productions.—Gum and resin-producing plants are numerous; the most important is the aloe sperryi, the Sokótrine aloes of commerce (called in the island, *tayef*; and by the Arabs, *súba*). The island has been famous for the first-named plant from the earliest times; it grows spontaneously on the sides and summits of the limestone mountains, at from 500 to 3,000 feet above the level of the plains.

The next in importance to the aloe is the dragon's-blood tree. Like the aloe it is usually met with on the hills, rarely at less than 800 feet and frequently as much as 2,000 feet above the sea.

The wood of a tree named *metayne*, a kind of box tree or large shrub which abounds in every part of the island, is so hard as to answer the same purposes as those to which *lignum vitæ* is applied, such as the manufacture of sheaves for blocks.

It is to their date groves, next to their flocks, that the inhabitants look for their means of support; but, notwithstanding the large quantities collected, the supply is not sufficient, and a large import takes place annually from Maskat. Melons, beans, small onions, and a little tobacco are grown. But little cereal culture is attempted; here and there a small enclosure of jowari may be seen, but the inhabitants are too lazy to cultivate it to any extent, the watering requiring much labour.

Vast numbers of cattle, sheep, goats, and asses are found on every part of the island; the two latter are, indeed, so numerous that the owners keep no account of them; there are also some camels here. The only wild animal is the civet cat. On the low lands, scorpions, centipedes, and a large and venomous description of spider, called *nargub* by the Arabs, are common.

Trade.—The trade of the island is small, ghi and aloes being the chief articles of export. It is carried on by *bágalas* from the Arabian coast. These arrive in the first month of the year with coffee, rice, and other articles, which they exchange for ghi, aloes, orchilla weed, &c., which they take to Zanzibar, bringing back cocoanuts, bombé, and American piece-goods. They dispose of as much of these as possible, returning to Arabia with aloes, dragon's blood, blankets, &c. Rupees are taken in payment for goods supplied, but the inhabitants prefer to barter in kind.

The Sultan takes tithes of all exports amounting to about \$1,000 a year, which, with his stipend of \$360 from the British Government, makes him a comparatively rich man.

The inhabitants of the island may be divided into two different classes—the Bedouins (many of whom are tall and well made), who inhabit the mountains and the high land near the western extreme of the

island, and who, there is every reason to believe, are the aborigines; and those who reside in Tamrida, Kadhup, Kallansiya, and the eastern end of the island—a mixed population, the descendants of Arabs, Indians, Africans, Portuguese, and several other nations. The whole population is estimated at about 5,000, but many people live in caves in the hills, so that it is impossible to form a correct estimate.

There is a language peculiar to the island in general use amongst its inhabitants, though Arabic is spoken by merchants when transacting business with the traders who visit it. It is not now a written language, though it appears formerly to have been so.

Anchorages.—With the exception of a few headlands, off which are projecting reefs, the shores of the island are bold, with moderate depths for some distance off-shore in places. There are several anchorages which afford protection according to the prevailing monsoon, but none affording shelter at all times. The southern side having few inhabitants and but little water, is seldom visited, but the anchorage is good. Ghubbets Kallansiya and Shoab at the western end, Ghubbet Nch on the south-western side and Bander Arasal at the south-eastern end, all afford good anchorage in the North-east monsoon. The northern side of the island is also considered safe in that monsoon from about February. In the South-west monsoon, there is fair anchorage in all the bays on the northern side eastward of Ras Kadarma. Bander Delaisha is by far the best in the strength of that monsoon. Tamrida is said to be more exposed to the violent gusts from the hills and to the swell, but it affords good shelter with the wind well off the land, and there is little danger with good ground tackle. These anchorages are usually on a narrow bank of sand or rocky bottom, sloping rapidly to deep water.

WINDS.—From November to January, the prevailing wind is N.N.E., and is the most dangerous wind on the northern side of the island, blowing in violent gusts for several days at a time.

From February to May is the fine weather season when the anchorages on the northern coast are considered safe.

In June, July, and August, the months when the South-west monsoon prevails, the natives say it blows incessantly in hard and violent gusts on the North coast; but on the low land of the South coast, the wind is more steady and less violent, with, however, a tremendous sea and surf. In these months, rain falls in showers, but not equal in quantity to that which falls during the squalls of November, December, and January.

In September, October, and part of November, light land and sea breezes are experienced, towards the latter part becoming more steady from the northward.

TIDES, CURRENTS.—The tides are very irregular, sometimes running in one direction for 16 hours, at other times only 6 hours, depending in great measure on the strength of the wind. The flood sets westward on the southern side of the island and eastward on its northern side; the ebb, in the opposite direction. The time of high water at full and change varies from 7h. 20m. to 8h. 40m. in different parts; springs rise from 6 to 8 feet. Close round the island the currents are influenced by the tides and winds, generally setting with the wind after blowing hard for any length of time. For the offing currents, see page 22.

WEST COAST.—RAS SHOAB, the western extreme of Sokótra, is a fine bold cape, being the termination of Jebel Shoab which rises to a height of 1,488 feet $2\frac{1}{2}$ miles eastward of the Ras. A reef extends about $1\frac{1}{2}$ cables from the cape, and the depths increase gradually from 14 fathoms at half a mile off the cape to the 100-fathoms contour-line about $4\frac{1}{2}$ miles off-shore.

Ghubbet Shoab, on the northern side of Ras Shoab and between it and Ras Baduwa, is a fine bay about 7 miles wide and receding 3 miles. It is completely exposed during the South-west monsoon, but affords good shelter with smooth water during the North-east monsoon, though at times strong gusts are experienced rendering boat sailing dangerous. The depths in the bay vary from 19 fathoms in line between the two points to 6 fathoms at 7 or 8 cables from the head of the bay; there are no known dangers, and the nature of the bottom is generally sand or rock.

Formerly, there was, in the neighbourhood, a population of about 150 persons who lived in caverns and in natural excavations, and in the village of Marthain Gibus where there is some good water to be obtained from wells; in March 1876, however, when visited by H.M.S. *Briton*, no natives were seen.

Anchorage.—The best anchorage, with smooth water during north-easterly winds, is 7 or 8 cables from the shore in 10 fathoms clear white sandy bottom, with Ras Baduwa bearing N. by E., Ras Shoab S.W. by W. $\frac{3}{4}$ W., and the Ass's Ears of Jebel Shoab S.W. by S. This anchorage is off some mangrove trees, close southward of which is a lagoon of salt water which rises and falls with the tide although it has no perceptible communication with the sea, being separated from it by a bank of sand nearly 2 cables in breadth; it extends inland, with mangrove trees on its banks, for nearly one mile.

Jezirat Sabuniya, immediately off Ghubbet Shoab, is a granite islet 4 cables long by three-quarters of a cable wide, 160 feet high, and culminating in three peaks; it may be seen at the distance of about 18 miles, when it resembles two vessels under sail, being white. From it, Ras Shoab bears S.E. $\frac{1}{2}$ E. 9 miles, and there are no dangers between,

See chart, No. 5.

there being in mid-channel no bottom at 130 fathoms; at from 5 to 8 cables from the rock there are from 25 to 30 fathoms.

SOUTH-WEST COAST.—From Ras Shoab the coast trends S.E. by E. nearly in a straight line for 10 miles to a sand-hill, where is a little bay known as Ghubbet Neh, in which is a small village. From this sandy bay to Ras Kattánahan, $7\frac{1}{2}$ miles farther south-eastward, the shore is rocky and precipitous, with several small points and bays, and has throughout from 3 to 6 fathoms water a few yards from it. The bottom along this part of the coast is in general sand and rock, with no hidden danger, but a bank of from 6 to 7 fathoms about half a mile wide and one mile from the shore, extends parallel with the shore for nearly the whole distance, with 8 or 9 fathoms water both inside and immediately outside it.

Anchorage.—Ghubbet Neh affords good shelter during the North-east monsoon. The coast is thinly inhabited by people living chiefly in excavations in the rocks.

Ras Kattánahan is an even, bold, perpendicular cape, 1,465 feet above the sea. It is the western extreme of the chain of mountains which, with several breaks, extends along the whole southern coast of Sokótra, generally at a short distance inland. The Ras has the same aspect whether viewed from East or West.

SOUTH COAST.—Tides.—The ebb along the southern side of Sokótra sets south-eastward about one mile an hour, depending greatly on the winds. It is high water, full and change, at about 7h., but the time is very irregular; springs rise 7 feet.

Jebel Kuireh, a chain of mountains of nearly the same height as Ras Kattánahan, extends 5 miles from it in an easterly direction. From Jebel Kuireh, the same chain of mountains, but with different names, continues, as has been already stated, nearly to the eastern end of the island, the different parts being merely separated by a few mountain passes by which the inhabitants travel on foot across the island to Tamrida. The mountains generally rise perpendicularly, like a wall, from the Naukad plain between them and the sea, which plain is from 2 to 4 miles wide. The Naukad plain affords pasture for sheep and goats, of which there are great numbers. The natives of the plain are few and much scattered, some living in huts, others in excavations in the base of the mountains.

Water.—The best water comes from the mountains, falling into natural reservoirs. There are wells on the plain, but the water is brackish and only used for the flocks. Near the villages of Hukari and Deairi, the water is somewhat better. The best reservoir is about 9 miles westward

of Ras Fálanj and close to the sea, being only separated from it by a bank of shingle where the low sandy beach terminates in rocky cliffs. This reservoir is supplied by a fine stream running through the Wadi Fálanj, between Jebel Fálanj and Jebel Sharbi. A vessel in want of water during the North-east monsoon, might procure it with ease by anchoring tolerably close in-shore, in 7 fathoms water, and at the same time might obtain sheep; caution should however be observed in communicating with the natives.

Anchorage.—The southern coast is bold to approach, the soundings decreasing gradually towards the shore. There is no danger, although in some places there are overfalls. The edge of the bank, within 100 fathoms, between Hakari and Ras Fálanj appears to be from 8 to 10 miles off-shore. A vessel may anchor anywhere along this coast in from 9 to 12 fathoms sand and coral, about one mile off-shore.

Bank.—About 17 miles southward of the island in about long. $53^{\circ} 52'$ E., one of the surveying vessels, during the night, crossed and recrossed a bank having only 15 fathoms, the water appearing very light coloured; it was not examined, time not permitting.

Hertha rock.—About 11 miles southward of the island, in the direction of the above bank, the German steam vessel *Hertha* on 4th November, 1897, passed close to a sunken coral patch, about 100 feet long, with apparently depths of 3 to 4 feet on it. From the patch the centre of Jezirat Darsa bore W. $\frac{1}{8}$ S., and Ras Kattánahan N.W. $\frac{3}{8}$ W. Approximate position, lat. $12^{\circ} 8' N.$, long. $53^{\circ} 50\frac{1}{2}' E.$

Ras Fálanj is about 6 miles S.W. by W. of Ras Radressa, the eastern extreme of the island; when seen from the westward it appears as a bluff cape, but, on a near approach, a low point is seen to project from it rather more than a mile, from which a reef of rocks, some above water and steep-to, extends south-eastward about 2 cables, on each side of which a bay is formed. The summit of the bluff 2 miles westward of Ras Fálanj is 1,505 feet above the sea, and from it the high land continues in a north-easterly direction, attaining a still greater height at Ras Momi, from whence the land falls to a moderately high mountain of granite, then to several small hillocks of the same formation, finally terminating in the low rocky point Ras Radressa.

Bander Arasal is the bay between Ras Fálanj and Ras Radressa.

A rocky bank, about three quarters of a mile in extent, with some parts dry, and from 5 to 6 fathoms between the heads, lies about one mile south-eastward of Ras Radressa. A high sea generally breaks on the rocks. The channel between these outer rocks and the reef extending from the point, has from 4 to 9 fathoms. It is rather less than half a

mile wide, with rapid currents which cause strong rippings; it is therefore imprudent to use it except in a case of emergency.

Anchorage.—There is anchorage in smooth water during the North-east monsoon, in about 9 fathoms, with the outer patch of rocks bearing E. by S. and Ras Radressa about N.E. $\frac{1}{2}$ E.

RAS RADRESSA is the comparatively low eastern extreme of the island, and forms two small rocky points, bearing N. by W. $\frac{3}{4}$ W. and S. by E. $\frac{3}{4}$ E. nearly one mile from each other. Off each point, a reef extends about 3 cables, over which there are strong tide rips, and at $1\frac{1}{4}$ miles both eastward and northward there is no bottom at 110 fathoms; consequently, in approaching this end of the island from either of these directions the lead affords no guide. Southward and south-eastward of the cape, the depths gradually decrease towards the shore to 26 fathoms at about 3 miles from the detached dry rocks off the point.

Ras Momi, or Ras Mutláh, is the extreme eastern, sharp, high bluff, or termination of the range of mountains running the whole length of the island, and is 1,920 feet high, being visible in clear weather at a considerable distance, when the lower land, 180 to 200 feet in height, nearer the extreme of Ras Radressa, 4 miles farther eastward is not visible. The width of the island from the north to the south shore at Ras Momi is but little over a mile.

NORTH-EAST COAST.—**Bander Faka**, or Thleife, is a small bay on the north-eastern side of the island, formed between a sandy point $1\frac{1}{2}$ miles westward of Ras Radressa, from which a reef extends about half a mile, and Ras Deidum. In the centre of the bay are two double sand-hills. The shore is low and sandy, backed at a distance of half a mile by moderately high mountains. This bay affords anchorage, protected from easterly winds by the reef, where small craft from India, on their pilgrimage to Jidda, stop to procure water in the months of April and May.

Anchorage.—The best anchorage is in from 9 to 12 fathoms water, about half a mile off-shore, with the outer break of the reef off the point bearing N.E., and Ras Deidum W. by N. $\frac{1}{2}$ N. Caution is requisite in rounding the point of the reef, for unless it is blowing fresh, the outer break of the reef, which has 5 fathoms close-to, is not always visible. In the western part of the bay the soundings are regular, decreasing gradually towards the shore.

Supplies.—Sheep, milk, and butter are procurable. Water is to be obtained from a well near the village, or from a spring which rises between the two eastern sand-hills. The well is probably the best place to procure

water, there being a considerable surf on the beach near the sand-hills if the wind is at all from the northward.

Ras Deidum is a rocky point about 250 feet high and about $8\frac{1}{2}$ miles W. by N. $\frac{1}{4}$ N. of Ras Radressa; it appears to be the eastern boundary of the fertile part of the island, for eastward of it a shrub is scarcely to be met with, except at the sand-hills alluded to as a watering-place, where there are a few trees; but, westward, both hill and valley are covered with luxuriant vegetation.

Ras Hammadara is a low rocky point 8 miles westward from Ras Deidum. North-eastward of the point, and half a mile distant, is a patch of rocks nearly dry, between which and the reef fringing the shore is a channel about $1\frac{1}{2}$ cables wide, with from 5 to 7 fathoms; the patch is steep-to to seaward.

The shore between Ras Deidum and Ras Hammadara is low, with an occasional rocky point, and sand and shingle in the intervening bays; there are some small date groves named Thuereh, Kleef, and Tumereh, with a fine fresh-water pool near Kleef. The high land is about 2 miles inland, and is more than 1,000 feet high. There are no dangers on this part of the coast, but it is not advisable to approach it in the north-east monsoon.

The shore between Ras Hammadara and Ras Dehammeri is also low, with occasional rocky points and sandy bays between, and is generally fronted by a narrow rocky ledge. The soundings are deep, the 20-fathoms line being about half a mile off-shore, from whence the bank rapidly deepens to no bottom at 180 fathoms at from one to 2 miles from the beach.

Khor Garrieh is a creek, nearly dry at low water, between Ras Hammadara and Ras Dehammeri. Its source is several miles in the interior, and it has numerous date trees growing on its banks.

Bander Garrieh is a small bay formed by the projecting point of Ras Dehammeri, where a vessel might anchor with the extreme point of the cape bearing from N.W. by N. to N.N.W. in from 6 to 10 fathoms, from $2\frac{1}{2}$ to 5 cables off-shore, and perfectly sheltered from the south-west monsoon.

Ras Dehammeri is a low narrow projecting neck of land from 500 to 700 yards across, having on it two remarkable hillocks by which it may always be known, the northern one being about 130 feet high. A rock, steep-to, lies close off the extreme point, and a rocky spit of $2\frac{1}{2}$ fathoms projects from the rocky point south-westward of it. There is no bottom at 270 fathoms 8 cables northward of the point.

Bander Debeni is the anchorage on the western side of Ras Dehammeri, protected from easterly winds. A small vessel may anchor in from 3 to $3\frac{1}{2}$ fathoms, south-westward of the rocky spit off the inner point,

with Ras Dehammeri bearing E.N.E. There is no danger in the bay except the spit, but the anchorage does not seem adapted for large vessels; the bottom is coral or rock.

Bander Delaisha is merely a continuation of Bander Debeni, and is bounded by a point on which is a small ruined mosque or tomb about $1\frac{3}{4}$ miles eastward of Ras Haulaf. In the centre of the bay is a sand-hill, and half a mile westward of it is Khor Delaisha, apparently closed in the dry season, but joined inland to a fine fresh-water stream with date trees on its banks.

The bay has good anchorage depths everywhere close in-shore, the 10-fathoms contour-line being from 5 to 8 cables from the beach. It affords the best shelter of any of the anchorages during the South-west monsoon. A good berth is with the sand-hill bearing South in from 7 to 9 fathoms, from 3 to 5 cables off-shore.

From the point on which the ruined mosque stands to the western extreme of Ras Haulaf the distance is about $2\frac{1}{2}$ miles.

NORTH COAST.—**Ras Haulaf**, the eastern point of Tamrida bay, is a low, rounded, projecting point, rising gradually towards the interior; it consists chiefly of undulating sand-hills covered with a prickly bush; on its sea-face, it has small rocky points with intervening sandy beaches. One mile north-eastward of the cape, there is no bottom with 190 fathoms, but northward and north-westward the bank does not appear to end so abruptly; it may be rounded with safety $2\frac{1}{2}$ cables distant.

TAMRIDA or HADIBO, called also Bilad-al-Sultan by the Arabs, is the capital of Sokótra. It consists of a number of white plastered stone houses, similar to those usually to be seen in Arabia, surrounding a larger one which is the residence of the Sultan. A dense date grove surrounds the town or village, which contains a population of about 400 only. It is prettily situated at the head of the open bay of Tamrida, of which Ras Haulaf to the eastward and Ras Hebak to the westward, and 7 miles apart, are the boundaries. The town is about 40 miles from the western and 30 miles from the eastern end of the island.

As already stated, the British flag was hoisted at Tamrida under a salute of 21 guns on the 30th October, 1886.

The small villages of Suk, Deshelenata, and Hernout lie eastward of the town, between it and Jebel Omhari, a remarkable sloping sand-hill on the eastern side of the bay. Three streams run into the sea from the hills; one near Tamrida, one at Suk at the foot of Jebel Omhari, and one between them.

The position of Tamrida may be known from the offing by the high craggy granite peaks of the mountain range which overhangs the plain on which it stands; of which range, Jebel Haggier, the loftiest part, rises to a

See chart, No. 5, with plan of Tamrida bay.

height of 4,656 feet above the sea; or, if the peaks are clouded, by Jebel Omhari, which, when seen from a distance of 10 or 12 miles on a S.E. by E. bearing, appears like a white cliff sloping to the southward; and also by Ras Haulaf, the low eastern point of the bay.

There is no danger in the bay; the depth increases gradually from the shore to 10 fathoms at one mile, and 20 fathoms at 3 miles, outside of which it apparently deepens rapidly. The nature of the bottom is sand and stones with patches of mud.

Landing.—The best landing place is on the shingle beach close to the western extreme, near the town, abreast of some date palms. During the North-east monsoon, when the breeze is fresh from seaward, there is a heavy surf on the beach, which renders landing both difficult and dangerous.

Anchorage.—During the South-west monsoon, the anchorage in Tamrida bay is exposed to strong gusts of wind from the land, and a heavy swell rolls in when the wind is well to the westward, rendering good ground tackle necessary; the holding ground is said to be fair. It appears to be a desirable anchorage for a few days for sailing vessels proceeding eastward, instead of returning to Aden when the South-west monsoon is unusually violent, particularly if the wind is well to the southward, when the water is comparatively smooth.

A good berth is in 9 fathoms, with Ras Haulaf bearing E.N.E., the large square house in the town about S. $\frac{1}{2}$ E., and Ras Hebak S.W. by W. $\frac{3}{4}$ W. There is good shelter close under Ras Haulaf in from 5 to 6 fathoms, from all winds eastward of N.E. by N., with comparatively easy landing, whilst off the town the sea may be breaking.

The bay is particularly unsafe from November to January, both months inclusive, the first half of the North-east monsoon, when heavy northerly squalls are frequent. From February to May is considered the finest season.

Tides.—It is high water, full and change, at Tamrida at about 7h. 50m.; springs rise, approximately, $7\frac{1}{2}$ feet.

Supplies.—Tamrida is the most convenient place in the island for a vessel in want of supplies, but at times they are scarce. Good water, bullocks, goats, sheep, fish, and firewood may generally be procured; fowls are scarce, and no vegetables are obtainable. Good aloes, dragon's blood in small quantities, grapes, water-melons, pumpkins, oranges, and plantains may be procured in the months of March and April.

Ras Hebak, the western extreme of Tamrida bay and the eastern extreme of Ghubbet Kadhup, is a bold perpendicular rocky point, having 5 fathoms water within a quarter of a mile of it.

See plan of Tamrida bay, on chart, No. 5.

Ghubbet Kadhup is the small bay westward of Tamrida bay lying between Ras Hebak and Ras Taab, in the centre of which are the villages of Kadhup, Mouri, and Kathub, each with about 50 inhabitants. There is a salt-water creek leading to Mouri and a swamp eastward of it. A vessel might anchor off here in the south-west monsoon.

Ras Taab, bearing W. by S. $\frac{1}{8}$ S. 11 miles from Ras Haulaf, is a low sandy point, with a reef running off about $1\frac{1}{2}$ cables.

GHUBBET KARMA.—**Ras Karma**, also a low sandy point and about $1\frac{1}{4}$ miles westward of Ras Taab, is the eastern extreme of Ghubbet Karma. A reef projects from it about $1\frac{1}{2}$ cables, and continuing eastward as far as Ras Taab, considerably increases the shelter afforded by the cape. The 5-fathoms line lies half a mile from the shore between these points.

Ras Kadarma, the western extreme of Ghubbet Karma, bears W. by N. $\frac{1}{2}$ N. $13\frac{1}{2}$ miles from Ras Karma, the bay receding in its eastern part nearly $3\frac{1}{2}$ miles southward of this line. It is a low point, and the termination of a high bluff close to it.

The shore of Ghubbet Karma is low and sandy, but, about 6 miles inland, a chain of mountains surrounds it, with an opening near the centre, through which the natives travel across the island. Southward of Ras Kadarma is another pass leading to the valley of Kallansiya. Straggling huts are scattered along the shores of the bay; the inhabitants possess numerous sheep and bullocks. Close to the shore, 6 miles westward of Ras Karma, is Khor Hadjun, a deep salt-water swamp with its entrance completely filled up; it extends about three-quarters of a mile inland and is bounded by moderately high cliffs.

Anchorage.—The best anchorage is 6 or 7 cables from the shore in 5 or 6 fathoms, with Ras Karma bearing N.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles. In the South-west monsoon, it is as open as Tamrida bay to the heavy swell which is so severely felt when the wind is well to the westward. During the North-east monsoon, there is considerable swell towards the western part of the bay.

The depths in the bay are regular, the 10-fathoms contour-line at the above anchorage being nearly $1\frac{1}{4}$ miles from the shore, the depth increasing to 28 fathoms at 4 miles. At about 5 miles north-westward of Ras Karma the depth is 290 fathoms; at the same distance north-eastward of Ras Kadarma it is 205 fathoms. Off Ras Kadarma the bank of soundings extends but a short distance, there being 816 fathoms within 2 miles of it to the northward. The nature of the bottom is sand and coral in-shore, and sand and shells in the offing.

NORTH-WEST COAST.—From Ras Kadarma, the coast trends W. by N. $\frac{1}{4}$ N. $4\frac{2}{3}$ miles to Ras Bashuri, off which, and joined to it by a

narrow neck of land 50 yards in length, is a remarkable pyramidal rock about 150 feet high. Between the two points, the water is deep close in-shore, and within 2 miles northward of Ras Bashuri soundings have been taken in 825 fathoms. Westward from the pyramidal rock, depths of from 5 to 20 fathoms are found a mile from the shore.

Ras Bashuri, with the coast $1\frac{1}{2}$ miles westward to Ras Samari, forms the most northern part of the island. The mountains, nearly 2,000 feet above the sea, rise in some places almost perpendicularly from the shore, and are fronted by a rocky beach. Between the two points, a part of the mountain side is covered with sand. Between Ras Samari and Ras Kallansiya, $2\frac{1}{4}$ miles apart, is an indentation of the original coast-line, which has, however, become so completely filled with sand as to form a mangrove swamp in what was the centre of the bay; and projecting from this, seaward, far beyond a line connecting the two points is a vast accumulation of sand, nearly all dry at low water, springs; from the north-western point of this sand-bank, the depth increases from one fathom to 20 fathoms within the space of 5 cables.

Ghubbet Kallansiya is a bay about 3 miles wide, affording shelter in the North-east monsoon; its eastern point is Ras Kallansiya, and its western boundary is a point nearly 3 miles eastward of the bluff point Ras Baduwa, the north-eastern point of Ghubbet Shoab. The village and mosque are in a grove of date and cocoa-nut trees, close to a lake of fresh water, about three quarters of a mile southward of the Ras. It is a penal settlement.

Ras Kallansiya, the eastern point of the bay, has four small granite peaks, by which it may always be known, as well as by the hills near them being covered in some places with sand.

Depths.—The depths in the bay under 10 fathoms are irregular with overfalls; W. by N. $7\frac{1}{2}$ cables from the mosque is a small $2\frac{1}{2}$ -fathoms patch on the edge of the shore bank. The 5-fathoms contour-line is from 8 cables to one mile from the shore all round the bay. From 20 fathoms, at less than $1\frac{1}{2}$ miles off the points of the bay, the soundings suddenly deepen to no bottom at 100 fathoms. The shore of the bay is fronted by a rocky reef nearly 2 cables wide, nearly all of which is dry at low water springs.

Anchorage.—The best anchorage for a small vessel is in 4 fathoms, about 4 cables off the sandy beach, which is the best landing place, with the northern granite peak on Ras Kallansiya bearing N.E. by E. $\frac{1}{2}$ E., and the mosque S.E. by E. Large vessels may anchor in from 7 to 10 fathoms, with the mosque S.E. about one mile. The bay affords no shelter in the South-west monsoon.

See chart, No. 5, with plan of Ghubbet Kallansiya.

Tides.—It is high water, full and change, at Kallansiya bay at 7h. 20m.; springs rise 8 feet. The flood sets eastward.

Supplies.—Good water and firewood are plentiful; also milk, sheep, and goats, if a few hours' notice of their being required is given. A few fowls, beans, and pumpkins are procurable. There is good fishing to be had. The natives will take water off in their own boats, but ships must supply casks.

Ras Baduwa is a bluff point about 300 feet high, and is the western termination of the Jebel Mali mountains. It forms the north-eastern point of Ghubbet Shoab, described at page 406; from it the coast takes a sudden turn southward. One mile northward of the point there are no soundings at 170 fathoms; but, westward, there are from 20 to 34 fathoms for nearly 5 miles, with a rocky bottom, and good fishing.

See chart, No. 5.

CHAPTER XI.

ADEN TO RAS SHARBITAT.

(Long. $45^{\circ} 3' E.$ to long. $56^{\circ} 20' E.$)

VARIATION IN 1900.

Makalla - - $1^{\circ} 50' W.$ Ras Fartak - - $1^{\circ} 20' W.$ | Khorya Morya islands - $0^{\circ} 40' W.$

The northern shore of the gulf of Aden, as far as and including the port and promontory of that name, are described in the concluding pages of Chap. VIII. Having in the last two chapters completed a detailed description of the western and southern shores of the gulf of Aden, including Sokotra and adjacent islands, we now revert to the northern or Arabian shore, continuing the description eastward from Aden, where it was left at page 353.

GHUBBET SEILAN.—From Aden, the coast trends northward for 15 miles and then eastward for about the same distance, to Ras Seilan, thus forming the deep bay named Ghubbet Seilan, whose shores are flat and sandy but rise gradually as Ras Seilan is approached. A low plain covered with stunted bushes extends from the shore some distance into the interior.

The coast, from the British boundary, eastward, is inhabited by the Fadthli, a numerous tribe reckoned at about 15,000 souls, and as a general rule not to be trusted, whose territory extends in an unbroken line for nearly 100 miles along the shore, beyond Shukra and as far as Makatein. In the interior is the Yafai tribe, spread over an extensive tract of country, including a portion of Jebel Yafai. This range, which rises about 6,500 feet above the sea, extends nearly 100 miles in an East and West direction, averaging between 20 and 30 miles from the shore. The Yafai territory is mountainous, with numerous valleys, producing coffee, wheat and millet.

The depths in Ghubbet Seilan are irregular, the 5-fathoms line being generally about one mile off-shore. Sailing vessels should avoid getting embayed with easterly winds. Several vessels have in former times been wrecked here and plundered by the natives.

See charts, Nos. 7 and 6 b.

Ras Seilan is a low, round, sandy point, with a few date trees growing near it and some large trees inland. About $1\frac{1}{2}$ miles northward of the cape is the village of Sheikh Abdulla.

Soundings extend about 10 miles off-shore, dropping suddenly from 40 to 100 fathoms; the 20-fathoms contour-line averages 5 miles from the land, the depth decreasing gradually from thence towards the shore. Sand, shells, and broken coral, is the general nature of the bottom.

The coast.—From Ras Seilan the coast trends in a north-easterly direction for 22 miles to Karn-am-Kulasi (Saddle hill), from thence more eastward to Shukra, with a sandy beach the whole way.

Al-Asala is a small town $11\frac{1}{2}$ miles N.N.E. $\frac{1}{4}$ E. of Ras Seilan and about 2 miles from the shore; the population, chiefly agricultural, is about 500. The country immediately around is well watered and cultivated. South-eastward of Al-Asala is the tomb of a sheikh near the beach, and close to it the fishermen draw up their boats.

Barrow rocks are two dangerous rocky reefs, with 2 fathoms water on the north-eastern patch, and as little as one fathom on the south-western; they are $1\frac{1}{4}$ miles apart, and about 2 miles from the shore, rather more than half way between Al-Asala and Shukra, from which latter place the northern reef bears S.W. $4\frac{1}{2}$ miles.

To avoid these rocks, do not come into less than 15 fathoms water while the dark Saddle hill or Karn-am-Kulasi bears between N.N.E. and N.W. by N. There is a channel with from 5 to 7 fathoms water, between the rocks and the reef which fronts the shore at a distance of nearly one mile. The deepest water is near the rocks; there is a width of nearly one mile between the north-eastern patch and the 5-fathoms line on the shore side of the channel, but, abreast of the south-western patch, that line is less than 5 cables distant.

SHUKRA, the principal port of the Fadthli territory, is a small village with a stone building called the castle, which is the residence of the sheikh for several months in the year. It is about a quarter of a mile from the beach, on the borders of a plain commencing at the foot of Jebel Fadthli or Kharazi, its eastern limit, having on the North the valley leading to Wadi Bahrein, and a barn-shaped hill with a peak on its western end. A number of granite hills terminating in a small eminence, form a point to the westward at some distance from the sea.

Jowari is cultivated here in large quantities, and in the vicinity of the village is a large grove of date trees.

Supplies.—Good water may be obtained at Shukra, also bullocks, sheep, poultry, onions, and pumpkins.

Trade.—The chief exports of Shukra are ambergris, coffee, jowari, and ghi. No fruit is grown except the plantain.

Anchorage.—A small harbour for boats, with from one to $2\frac{1}{2}$ fathoms water, is formed by a break in the reef which fronts the shore at a distance of half a mile. The mark for entering this harbour is, the castle on with the peak of the western end of the barn-shaped hill inland. There is very good anchorage in from 7 to 9 fathoms 4 or 5 cables outside the reef, with the castle bearing N. by E., and Karn-am-Kulasi, or Saddle hill, about W. by N.

Tides.—It is high water, full and change, at 8 h. ; springs rise 6 feet ; the flood sets westward.

The Fadthli territory is stated as here extending inland about 80 miles. The country is chiefly mountainous, Jebel Aris, a high range 14 miles north-eastward of Shukra, attaining a height of 5,596 feet above the sea. The Wadi Bahrein winds through this range of mountains, abundantly supplied with streams which flow into an extensive lake, from whence the valley takes its name. The largest village in this district is Mein, with a population of about 1,500, said to be 36 hours' journey north-westward of Shukra. The natives are a fine bold-looking race, many of them inhabiting caves in the mountains ; their religion is a lax state of Mohammedanism, the fast of the Ramazan passing almost unnoticed.

The Coast from Shukra eastward to Makâtein, a distance of about 45 miles, becomes irregular, jutting out into small points ; for the first 13 miles it is flat, until Jebel Fadthli is approached, which range ascends gradually from the shore. At 16 miles eastward of Shukra, there is a ruin on the coast, with a village northward of it about 3 miles inland, and a tomb about 7 miles farther eastward.

The soundings on this part of the coast extend a very short way off the shore, there being from 20 to 30 fathoms about one mile from it, and more than 100 fathoms at 2 miles.

Jebel Fadthli is the lofty range of mountains extending about 35 miles in an East and West direction, about 5 miles inland and parallel with the coast line ; its summit is singularly broken into gables, peaks, and bluff points. The most conspicuous gable is rather westward of the centre of the range and rises 4,000 feet above the sea ; it is remarkable for an opening like a great embrasure or cleft, which gives it, from the eastward, the appearance of a double peak, from whence it descends almost perpendicularly towards the sea. The highest point of the range is Jebel Aris, to the westward, which is 5,596 feet above the sea ; from this it declines slightly to the eastward, where a barn-shaped mountain attains a height of 3,950 feet. The valleys intersecting this range of mountains are thickly covered with vegetation.

Makátein Seghir, or the lesser, is a small anchorage for boats, formed by a projecting point 5 miles westward of Makátein. The water is shallow and the bottom rocky.

MAKÁTEIN, in long. $46^{\circ} 26' E.$, is an anchorage formed by a slightly projecting rocky point, from whence four rocky islets and a sunken rock project $2\frac{1}{2}$ cables to the southward. A rocky patch of 3 feet lies 3 cables S. by W. of the islets, with a 4-fathoms patch at 3 cables S.S.E. of it; another patch, of $1\frac{1}{4}$ fathoms, lies nearly half a mile eastward of the outer islet. Makátein is resorted to by native trading vessels for shelter during the North-east monsoon; the anchorage is on the western side of the islets, where the water is perfectly smooth when blowing hard from the north-eastward. The islets are white from the guano deposited by sea birds which frequent them in great numbers; it is used by the natives for agricultural purposes.

Makátein may be easily known by two black hills immediately eastward of it and close to the sea; there are others 3 or 4 miles farther eastward, but not so distinctly separate as the former; when approaching from the eastward, they resemble one long hill. At a quarter of a mile northward of the point, abreast of the islets, is a black ruin.

Tides.—It is high water, full and change, at Makátein, at 9 h.; springs rise 6 feet; the flood sets westward.

The Coast.—At 6 miles eastward of Makátein is a rocky point named Sambahíá, and for 13 miles beyond, as far as Hauta village, a low sandy shore with rocky points prevails; it is also low westward of Makátein, and in many parts continues low for some miles inland, almost reaching the border of the Fadthli mountains. There are no dangers on this part of the coast; the 10-fathoms line is about one mile, and the 100-fathoms contour-line about 6 miles from the shore.

AHWAR is a town 5 miles inland of Hauta, situated on a wide plain and bounded on the north by high mountains; the tops of the houses only are perceptible from a vessel in passing. It is the principal residence of the chief of the Aulaki tribe, and has a population of about 5,000, chiefly agricultural.

The Aulaki territory extends about 55 miles along the coast, between Makátein and Wadi Sanam, and is said to reach 200 miles inland. The coast is very flat, but about 35 miles inland is a high mountainous range of very irregular outline. The tribe is said to muster from 7,000 to 8,000 fighting men.

Supplies.—An abundant supply of good water may be procured from Ahwar, also bullocks and excellent fish.

Ras Aulaki is the low sandy point fronting **Alhwar**, on which stands the village of **Hauta**.

Sheikha Hurba.—The tomb of **Sheikha Hurba**, a female devotee, is 22 miles eastward of **Hauta**; this ancient shrine, being whitened, is a conspicuous object near the beach, and can be seen for several miles. **Wadi Sanam**, the eastern limit of the **Aulaki** territory, is 10 miles eastward of this tomb; this valley is useless as a mark and cannot be distinguished by a vessel coasting at 3 or 4 miles from the shore.

Dives shoal, composed of sand, with a depth of about 16 feet, on which the French transport *Dives* touched, is stated to lie about 3 miles off-shore, with **Sheikha Hurba** bearing N.N.E. $\frac{1}{2}$ E., and **Black hill** N. by W.

The Coast.—About 18 miles eastward of the tomb of **Sheikha Hurba** is the mosque of **Sheikh Abdurrahman Baddas**, and the small fishing village of **Irka**, standing on a low, round, sandy point; the mosque does not show well, but about $1\frac{1}{2}$ miles eastward of it, a square tower, which is a very conspicuous object, may be seen from a distance of 10 or 12 miles when approaching either from the eastward or westward. The coast from **Hauta** is nearly straight in an E. by N. $\frac{1}{4}$ N. direction to the village of **Irka**; from thence it turns north-eastward to **Ras al Ghusáin**, about 29 miles, and is low and sandy.

The depths off this part of the coast, and as far eastward as **Ras al Ghusáin**, are regular, the 20-fathoms contour-line being about 2 miles, and the 100-fathoms line from 4 to 6 miles off-shore; the bottom is sand, coral, and shells.

Ras Safwan, a slightly projecting point about half way between **Irka** and **Ras al Ghusáin**, is thinly covered with bushes on its extreme edge. **Haura** is a small village just north-eastward of **Ras Safwan** and is a place of no note; it has two square towers, each about 50 feet high.

Jebel Makanati is a projecting bluff 5 miles north-eastward of **Ras Safwan**, and forming with that point a small bay suitable for boats to anchor in. This whitish-looking bluff rises about 200 feet above the sea and is reined by dark strata; it terminates in sand-hills, and a rock lies close off it.

Jebel Humeiri is a range of mountains abreast of **Ras Safwan** and **Ras Ghusáin**; they form the leading feature on this part of the **Arabian** coast, extending from 25 to 30 miles in a north-easterly direction; the highest central peak rises to a height of 5,284 feet, about 16 miles northward of **Ras Safwan**. The aspect of the whole range is dismal and rugged; when seen from either south-eastward or south-westward, its summit

resembles the roof of a barn, and cannot be mistaken by a vessel approaching on these bearings.

The extensive valley of Wadi Maifáa is at the eastern foot of the Humeiri range; northward of the range, and, apparently, in a prolongation of the Wadi Maifáa, is the remarkable ruin named Nakb al Hajar, with many ancient inscriptions.

The territory of the Diyabi tribe extends along the coast for about 36 miles, from Wadi Sanam to Ras al Ghusáin, and inland northward of the Humeiri mountains. The tribe numbers about 800, its people bear a bad character.

Ras al Ghusáin is a low rounded sandy cape 13 miles north-eastward of Ras Safwan, and has or had on it two large trees near the shore.

GHUBBET AIN.—Between Ras al Ghusáin and Ras al Aseida, a distance of 22 miles in an E. $\frac{1}{2}$ N. direction, a bay named Ghubbet Ain is formed, receding 6 miles from a line connecting the two points. On its shores are the villages of Ain-ba-Máabad and Ain al Jaweiri, the former consists of a mosque and about 100 huts; the latter of about 70 huts; springs of water (as the name Ain denotes), date trees, and jowari abound. Farther eastward is the small fishing village of Jilláa, and the anchorage of Bal-haf.

The depths in this bay on the western side are 20 fathoms at 4 miles off-shore, decreasing gradually towards the shore; the eastern side is deeper, and here are depths of 100 fathoms within 3 miles of the shore.

Ras al Aseida, in long. $48^{\circ} 10' E.$, the eastern point of Ghubbet Ain, is conspicuous from having at its extreme a dark, rocky, conical hill, 160 feet high, and not unlike a haycock, discernible at a distance of 5 or 6 miles. The Ras forms three projecting rocky points, off which the water is deep, there being 40 fathoms within 2 or 3 cables of the shore, and 100 fathoms at the distance of a mile.

Bal-haf.—In a small bay westward of Ras al Aseida is the town of Bal-haf, so named from a sheikh whose burial-place is contiguous. The bay affords good shelter during easterly winds; a sharp look-out must, however, be kept in the event of the wind changing to the westward.

Trade.—There seems to be a small trade here, consisting principally in importations of coffee, cotton cloths, and coarse silks, brought from Makalla, Ash-Shehr, and Aden. The tower is garrisoned by a few Wahidi soldiers, who levy tolls on all merchandise landed. There is no fresh water but that which is brought from a distance.

Tides.—It is high water, full and change, at 8 h. 30 m.; springs rise $5\frac{1}{2}$ or 6 feet; the flood sets westward.

See chart, No. 6b, and plan, No. 10.

Directions.—The nature of the bottom in Ghubbet Ain is sand, entirely free from rocks until the shore is neared in the eastern part, and the soundings are regular; but, when standing towards Bal-haf care must be taken to avoid the rocky bank which extends half a mile from the shore, between one and 3 miles north-westward of Ras al Aseida. Entering the bay with an easterly wind, the point should be rounded at about 2 cables, and a vessel should be prepared to meet the sudden gusts which may be expected on passing it and which frequently blow with considerable force. From abreast of the point, keep Black Barn hill a point on the starboard bow in making for the anchorage. As the bank of soundings is very steep, a good scope of cable is necessary to prevent a vessel dragging her anchor into deep water.

The coast eastward of Ras al Aseida takes an easterly direction for about 30 miles, as far as Ras al Kalb; for the first half of the distance, to Ras Makdaha, the shore is irregular with projecting points and small intervening bays.

Ras ar Ratl, 5 miles eastward of Ras al Aseida, a remarkable round volcanic promontory, is of considerable height, with a hollow in the centre, apparently an extinct crater; on each side of the point is a bay suitable for boats.

Jebel Husn Ghoráb, 5 miles eastward of Ras ar Ratl, is a square-shaped, dreary-looking, brown hill, 456 feet in height, with steep sides. On the summit are some very interesting remains of an ancient city, from which it may be assumed that it was formerly one of the most important places on the Arabian coast.

BANDER HUSN GHORÁB a small, secure, and well-sheltered bay, $1\frac{1}{2}$ miles wide by one mile deep, lies immediately eastward of Jebel Husn Ghoráb, which forms its south-western point. Off the eastern side of the bay, a reef extends, reducing the width of the entrance to about 8 cables. At the head of the bay is the square tower and hamlet of Bir Ali, or the well of Ali, and several adjoining hamlets.

Halánia island, a rocky limestone plain, three-quarters of a mile long by half a mile wide, lies about one mile southward of Husn Ghoráb point, and is separated from it by a narrow channel. Several rocky points project from the island, and off its eastern side are rocky patches with from $2\frac{1}{2}$ to 4 fathoms extending fully 4 cables from the eastern point in a S.E. by E. direction. Westward of the island, there is tolerable shelter from easterly winds.

Sharan is a circular, table-topped, sandstone hill, 300 feet high and $3\frac{1}{2}$ miles eastward of Husn Ghoráb; it is remarkable for a cavity or crater-shaped hollow full of water, called Kharif Sharan, the edge of which is fringed by an overhanging bank of mangrove trees. The diameter of the

cavity is about 2,500 yards, and, in depth, it is reported by the Arabs to be fathomless ; the water is very salt.

Directions.—In standing into Bander Husn Ghoráb, after rounding Halánia island in 8 or 9 fathoms, and at a safe distance in order to avoid the shoal extending from its eastern side, steer for the square tower of Bir Ali, taking care not to bring it northward of N. by E. $\frac{1}{2}$ E. in order to avoid the reef ; anchoring in 4 fathoms about a quarter of a mile off-shore. Approaching the bay from the eastward, a vessel should not approach the eastern point under a depth of 12 fathoms. During the South-west monsoon, a vessel may keep more to the westward, bringing the dark barn-shaped hill, Husn Ghoráb, nearly South ; there is no danger on this western side. The bottom is generally clear sand with an occasional patch of rock.

Ghutdhrin islets lie about one mile off-shore, 4 miles eastward of Husn Ghoráb, and nearly abreast of Ras Khada, a rocky point at the foot of Sharan hill ; there are one large and two lesser rocks, having a 12-fathoms channel $1\frac{1}{2}$ cables wide between the largest and least, and also a channel between them and the shore with 7 or 8 fathoms. Between the two smaller islets it is almost dry at low water.

Sikkah, or Jibus, is another small island rising 450 feet above the sea, about 5 miles southward of Ras Khada ; it may be seen at a distance of 28 miles. The summit is flat, and white from the guano deposited by birds which resort hither in great numbers. There are no dangers about the island, and a vessel may approach it in any direction, there being 30 fathoms water all round. The depths between it and the Ghutdhrin islets vary from 20 to 30 fathoms, and the 100 fathoms contour-line passes 2 miles seaward of it.

Makdaha anchorage.—Ras Makdaha is a dark and moderately high point, it being the southern termination of a range of hills which extend 10 miles inland ; it forms the eastern limit of the bay of Makdaha, which is $3\frac{1}{2}$ miles across and affords excellent anchorage and shelter from easterly winds. This bay is free from danger, with the exception of a sunken rock half a mile off-shore on its north-western side ; the soundings are regular and the shore bold to approach.

The little village of Makdaha is in the eastern angle of the bay ; it affords no supplies and the water is indifferent. It is the residence of a chief, a tributary to the sultan of the Wahidi tribe, who derives the principal part of his revenue from the guano from the islets. The inhabitants are wholly dependent on other ports for food.

Barraka island is a small, precipitous, and lofty limestone rock, off Ras Makdaha, without a vestige of vegetation ; between it and the Ras is a safe 15-fathoms channel one mile wide.

Anchorage.—A small harbour for boats, with from one to $2\frac{1}{2}$ fathoms water, is formed by a break in the reef which fronts the shore at a distance of half a mile. The mark for entering this harbour is, the castle on with the peak of the western end of the barn-shaped hill inland. There is very good anchorage in from 7 to 9 fathoms 4 or 5 cables outside the reef, with the castle bearing N. by E., and Karn-am-Kulasi, or Saddle hill, about W. by N.

Tides.—It is high water, full and change, at 8 h. ; springs rise 6 feet ; the flood sets westward.

The Fadthli territory is stated as here extending inland about 80 miles. The country is chiefly mountainous, Jebel Aris, a high range 14 miles north-eastward of Shukra, attaining a height of 5,596 feet above the sea. The Wadi Bahrein winds through this range of mountains, abundantly supplied with streams which flow into an extensive lake, from whence the valley takes its name. The largest village in this district is Mein, with a population of about 1,500, said to be 36 hours' journey north-westward of Shukra. The natives are a fine bold-looking race, many of them inhabiting caves in the mountains ; their religion is a lax state of Mohammedanism, the fast of the Ramazan passing almost unnoticed.

The Coast from Shukra eastward to Makátein, a distance of about 45 miles, becomes irregular, jutting out into small points ; for the first 13 miles it is flat, until Jebel Fadthli is approached, which range ascends gradually from the shore. At 16 miles eastward of Shukra, there is a ruin on the coast, with a village northward of it about 3 miles inland, and a tomb about 7 miles farther eastward.

The soundings on this part of the coast extend a very short way off the shore, there being from 20 to 30 fathoms about one mile from it, and more than 100 fathoms at 2 miles.

Jebel Fadthli is the lofty range of mountains extending about 35 miles in an East and West direction, about 5 miles inland and parallel with the coast line ; its summit is singularly broken into gables, peaks, and bluff points. The most conspicuous gable is rather westward of the centre of the range and rises 4,000 feet above the sea ; it is remarkable for an opening like a great embrasure or cleft, which gives it, from the eastward, the appearance of a double peak, from whence it descends almost perpendicularly towards the sea. The highest point of the range is Jebel Aris, to the westward, which is 5,596 feet above the sea ; from this it declines slightly to the eastward, where a barn-shaped mountain attains a height of 3,950 feet. The valleys intersecting this range of mountains are thickly covered with vegetation.

Makátein Seghir, or the lesser, is a small anchorage for boats, formed by a projecting point 5 miles westward of Makátein. The water is shallow and the bottom rocky.

MAKÁTEIN, in long. $46^{\circ} 26'$ E., is an anchorage formed by a slightly projecting rocky point, from whence four rocky islets and a sunken rock project $2\frac{1}{2}$ cables to the southward. A rocky patch of 3 feet lies 3 cables S. by W. of the islets, with a 4-fathoms patch at 3 cables S.S.E. of it; another patch, of $1\frac{1}{4}$ fathoms, lies nearly half a mile eastward of the outer islet. Makátein is resorted to by native trading vessels for shelter during the North-east monsoon; the anchorage is on the western side of the islets, where the water is perfectly smooth when blowing hard from the north-eastward. The islets are white from the guano deposited by sea birds which frequent them in great numbers; it is used by the natives for agricultural purposes.

Makátein may be easily known by two black hills immediately eastward of it and close to the sea; there are others 3 or 4 miles farther eastward, but not so distinctly separate as the former; when approaching from the eastward, they resemble one long hill. At a quarter of a mile northward of the point, abreast of the islets, is a black ruin.

Tides.—It is high water, full and change, at Makátein, at 9 h.; springs rise 6 feet; the flood sets westward.

The Coast.—At 6 miles eastward of Makátein is a rocky point named Sambahíá, and for 13 miles beyond, as far as Hauta village, a low sandy shore with rocky points prevails; it is also low westward of Makátein, and in many parts continues low for some miles inland, almost reaching the border of the Fadthli mountains. There are no dangers on this part of the coast; the 10-fathoms line is about one mile, and the 100-fathoms contour-line about 6 miles from the shore.

AHWAR is a town 5 miles inland of Hauta, situated on a wide plain and bounded on the north by high mountains; the tops of the houses only are perceptible from a vessel in passing. It is the principal residence of the chief of the Aulaki tribe, and has a population of about 5,000, chiefly agricultural.

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Supplies.—An abundant supply of good water may be procured from Ahwar, also bullocks and excellent fish.

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Sheikha Hurba.—The tomb of Sheikha Hurba, a female devotee, is 22 miles eastward of Hauta; this ancient shrine, being whitened, is a conspicuous object near the beach, and can be seen for several miles. Wadi Sanam, the eastern limit of the Aulaki territory, is 10 miles eastward of this tomb; this valley is useless as a mark and cannot be distinguished by a vessel coasting at 3 or 4 miles from the shore.

Dives shoal, composed of sand, with a depth of about 16 feet, on which the French transport *Dives* touched, is stated to lie about 3 miles off-shore, with Sheikha Hurba bearing N.N.E. $\frac{1}{2}$ E., and Black hill N. by W.

The Coast.—About 18 miles eastward of the tomb of Sheikha Hurba is the mosque of Sheikh Abdurrahman Baddas, and the small fishing village of Irka, standing on a low, round, sandy point; the mosque does not show well, but about $1\frac{1}{2}$ miles eastward of it, a square tower, which is a very conspicuous object, may be seen from a distance of 10 or 12 miles when approaching either from the eastward or westward. The coast from Hauta is nearly straight in an E. by N. $\frac{1}{4}$ N. direction to the village of Irka; from thence it turns north-eastward to Ras al Ghusáin, about 29 miles, and is low and sandy.

The depths off this part of the coast, and as far eastward as Ras al Ghusáin, are regular, the 20-fathoms contour-line being about 2 miles, and the 100-fathoms line from 4 to 6 miles off-shore; the bottom is sand, coral, and shells.

Ras Safwan, a slightly projecting point about half way between Irka and Ras al Ghusáin, is thinly covered with bushes on its extreme edge. Haura is a small village just north-eastward of Ras Safwan and is a place of no note; it has two square towers, each about 50 feet high.

Jebel Makanati is a projecting bluff 5 miles north-eastward of Ras Safwan, and forming with that point a small bay suitable for boats to anchor in. This whitish-looking bluff rises about 200 feet above the sea and is reined by dark strata; it terminates in sand-hills, and a rock lies close off it.

Jebel Humeiri is a range of mountains abreast of Ras Safwan and Ras Ghusáin; they form the leading feature on this part of the Arabian coast, extending from 25 to 30 miles in a north-easterly direction; the highest central peak rises to a height of 5,284 feet, about 16 miles northward of Ras Safwan. The aspect of the whole range is dismal and rugged; when seen from either south-eastward or south-westward, its summit

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The extensive valley of Wadi Maifáa is at the eastern foot of the Humeiri range; northward of the range, and, apparently, in a prolongation of the Wadi Maifáa, is the remarkable ruin named Nakb al Hajar, with many ancient inscriptions.

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Ras al Ghusáin is a low rounded sandy cape 13 miles north-eastward of Ras Safwan, and has or had on it two large trees near the shore.

GHUBBET AIN.—Between Ras al Ghusáin and Ras al Aseida, a distance of 22 miles in an E. $\frac{1}{2}$ N. direction, a bay named Ghubbet Ain is formed, receding 6 miles from a line connecting the two points. On its shores are the villages of Ain-ba-Máabad and Ain al Jaweiri, the former consists of a mosque and about 100 huts; the latter of about 70 huts; springs of water (as the name Ain denotes), date trees, and jowari abound. Farther eastward is the small fishing village of Jilláa, and the anchorage of Bal-haf.

The depths in this bay on the western side are 20 fathoms at 4 miles off-shore, decreasing gradually towards the shore; the eastern side is deeper, and here are depths of 100 fathoms within 3 miles of the shore.

Ras al Aseida, in long. $48^{\circ} 10' E.$, the eastern point of Ghubbet Ain, is conspicuous from having at its extreme a dark, rocky, conical hill, 160 feet high, and not unlike a haycock, discernible at a distance of 5 or 6 miles. The Ras forms three projecting rocky points, off which the water is deep, there being 40 fathoms within 2 or 3 cables of the shore, and 100 fathoms at the distance of a mile.

Bal-haf.—In a small bay westward of Ras al Aseida is the town of Bal-haf, so named from a sheikh whose burial-place is contiguous. The bay affords good shelter during easterly winds; a sharp look-out must, however, be kept in the event of the wind changing to the westward.

Trade.—There seems to be a small trade here, consisting principally in importations of coffee, cotton cloths, and coarse silks, brought from Makalla, Ash-Shehr, and Aden. The tower is garrisoned by a few Wahidi soldiers, who levy tolls on all merchandise landed. There is no fresh water but that which is brought from a distance.

Tides.—It is high water, full and change, at 8 h. 30 m.; springs rise $5\frac{1}{2}$ or 6 feet; the flood sets westward.

Directions.—The nature of the bottom in Ghubbet Ain is sand, entirely free from rocks until the shore is neared in the eastern part, and the soundings are regular; but, when standing towards Bal-haf care must be taken to avoid the rocky bank which extends half a mile from the shore, between one and 3 miles north-westward of Ras al Aseida. Entering the bay with an easterly wind, the point should be rounded at about 2 cables, and a vessel should be prepared to meet the sudden gusts which may be expected on passing it and which frequently blow with considerable force. From abreast of the point, keep Black Barn hill a point on the starboard bow in making for the anchorage. As the bank of soundings is very steep, a good scope of cable is necessary to prevent a vessel dragging her anchor into deep water.

The coast eastward of Ras al Aseida takes an easterly direction for about 30 miles, as far as Ras al Kalb; for the first half of the distance, to Ras Makdaha, the shore is irregular with projecting points and small intervening bays.

Ras ar Ratl, 5 miles eastward of Ras al Aseida, a remarkable round volcanic promontory, is of considerable height, with a hollow in the centre, apparently an extinct crater; on each side of the point is a bay suitable for boats.

Jebel Husn Ghoráb, 5 miles eastward of Ras ar Ratl, is a square-shaped, dreary-looking, brown hill, 456 feet in height, with steep sides. On the summit are some very interesting remains of an ancient city, from which it may be assumed that it was formerly one of the most important places on the Arabian coast.

BANDER HUSN GHORÁB a small, secure, and well-sheltered bay, $1\frac{1}{2}$ miles wide by one mile deep, lies immediately eastward of Jebel Husn Ghoráb, which forms its south-western point. Off the eastern side of the bay, a reef extends, reducing the width of the entrance to about 8 cables. At the head of the bay is the square tower and hamlet of Bir Ali, or the well of Ali, and several adjoining hamlets.

Halánia island, a rocky limestone plain, three-quarters of a mile long by half a mile wide, lies about one mile southward of Husn Ghoráb point, and is separated from it by a narrow channel. Several rocky points project from the island, and off its eastern side are rocky patches with from $2\frac{1}{2}$ to 4 fathoms extending fully 4 cables from the eastern point in a S.E. by E. direction. Westward of the island, there is tolerable shelter from easterly winds.

Sharan is a circular, table-topped, sandstone hill, 300 feet high and $3\frac{1}{2}$ miles eastward of Husn Ghoráb; it is remarkable for a cavity or crater-shaped hollow full of water, called Kharif Sharan, the edge of which is fringed by an overhanging bank of mangrove trees. The diameter of the

See plan, No. 10, and chart, No. 66.

cavity is about 2,500 yards, and, in depth, it is reported by the Arabs to be fathomless; the water is very salt.

Directions.—In standing into Bander Husn Ghoráb, after rounding Halánia island in 8 or 9 fathoms, and at a safe distance in order to avoid the shoal extending from its eastern side, steer for the square tower of Bir Ali, taking care not to bring it northward of N. by E. $\frac{1}{2}$ E. in order to avoid the reef; anchoring in 4 fathoms about a quarter of a mile off-shore. Approaching the bay from the eastward, a vessel should not approach the eastern point under a depth of 12 fathoms. During the South-west monsoon, a vessel may keep more to the westward, bringing the dark barn-shaped hill, Husn Ghoráb, nearly South; there is no danger on this western side. The bottom is generally clear sand with an occasional patch of rock.

Ghutdhrin islets lie about one mile off-shore, 4 miles eastward of Husn Ghoráb, and nearly abreast of Ras Khada, a rocky point at the foot of Sharan hill; there are one large and two lesser rocks, having a 12-fathoms channel $1\frac{1}{2}$ cables wide between the largest and least, and also a channel between them and the shore with 7 or 8 fathoms. Between the two smaller islets it is almost dry at low water.

Sikkah, or Jibus, is another small island rising 450 feet above the sea, about 5 miles southward of Ras Khada; it may be seen at a distance of 28 miles. The summit is flat, and white from the guano deposited by birds which resort hither in great numbers. There are no dangers about the island, and a vessel may approach it in any direction, there being 30 fathoms water all round. The depths between it and the Ghutdhrin islets vary from 20 to 30 fathoms, and the 100 fathoms contour-line passes 2 miles seaward of it.

Makdaha anchorage.—Ras Makdaha is a dark and moderately high point, it being the southern termination of a range of hills which extend 10 miles inland; it forms the eastern limit of the bay of Makdaha, which is $3\frac{1}{2}$ miles across and affords excellent anchorage and shelter from easterly winds. This bay is free from danger, with the exception of a sunken rock half a mile off-shore on its north-western side; the soundings are regular and the shore bold to approach.

The little village of Makdaha is in the eastern angle of the bay; it affords no supplies and the water is indifferent. It is the residence of a chief, a tributary to the sultan of the Wahidi tribe, who derives the principal part of his revenue from the guano from the islets. The inhabitants are wholly dependent on other ports for food.

Barraka island is a small, precipitous, and lofty limestone rock, off Ras Makdaha, without a vestige of vegetation; between it and the Ras is a safe 15-fathoms channel one mile wide.

RAS AL KALB, or cape Dog, is a low, round, sandy cape, 13 miles eastward of Ras Makdaha, the intervening shore being also low and sandy. Great caution should be observed in approaching it during the night, as, from being so low, it is not easily discernible; there is a depth of 14 fathoms at one mile from the shore, and 50 fathoms about 2 miles off; attention to the lead, therefore, gives warning of the approach to the shore.

The Coast.—From Ras al Kalb the coast turns rather abruptly in a north-eastern direction for 38 miles, as far as Makalla. The first part of it is very barren and sombre in aspect, and sand-hills extend for some miles inland. The distant mountains in the interior appear equally sombre, yet relieved by a very irregular outline, assuming the forms of peaks, bluffs, &c., and rising almost precipitously to a height of from 2,000 to 4,000 feet above the sea.

RAS REHMAT or cape of Wind's Death, 8 miles north-eastward of Ras al Kalb, is about 300 feet high, composed of limestone, and of a dark peaked outline. On its south-western face, the sand from the plain has been swept up into a great heap by the South-west monsoon. It takes its name "lull of the wind," a term frequently used by the Arabs when it falls calm, from the experience of dhows in running up the coast during the *tadh birch*, or early part of the South-west monsoon; the Arabs considering that when they round this point the violence of the wind has abated. From seaward, Ras Rehmat is remarkable as being the commencement of the bold, dark, and precipitous land extending to within 15 miles of Makalla.

The Wahidi tribe consists of several thousand persons, and, it is said, can muster 2,000 matchlocks in case of war. They are a brave and hospitable race, civil and generous to strangers who treat them with familiar kindness, but cunning and revengeful when oppressed; they are much respected and feared by their neighbours; their inland towns are considerable, and well populated. Ras Rehmat is the eastern limit of the Wahidi territory, which has a coast-line 60 miles in extent; its only two anchorages are Bal-haf and Husn Ghoráb.

Ras Assassa, or Asr-al-Hamra (red footsteps), is a rocky point, being the termination to seaward of a rugged range of hills which extends some distance inland. This cape is 6 miles north-eastward of Ras Rehmat, and in the valley between lies the town of Al-Ghaidhar, about 4 miles inland amongst luxuriant groves of date trees.

The soundings off this part of the coast are deep, there being 60 fathoms water at $1\frac{1}{2}$ miles from the shore.

RAS BURUM is a bold, dark, craggy point, 8 or 10 miles north-eastward of Ras Assassa, composed chiefly of limestone, the highest point

See chart, No. 6a.

of which is visible at a distance of 38 miles; a reef, steep-to, extends a third of a mile eastward of it.

Between this point and Ras al Himar or the red cape, is the small bay, Ghubbet Kulup, in which the anchorage is indifferent; and again between Ras al Himar and Ras Assassa is another small bay in which is a hamlet inhabited by people of the Buheishi tribe.

BANDER BURUM is the bay $1\frac{1}{2}$ miles wide, northward of Ras Burum, between it and the bluff point of Radham. It is a secure anchorage during the South-west monsoon, but is open to easterly and north-easterly winds. Landing is at times difficult on account of the surf and rocks on the beach.

The town of Burum is in the north-western angle of the bay; it is surrounded by date trees, and stands immediately at the foot of an offset of the range of hills, about 1,100 feet high, which here extends down to the sea and forms a bold and rocky coast. This wretchedly built town, of which the population is about 500, as well as Fuwah, Al-Ghaidhar, &c., is under the chief of the Buheishi tribe, who has also several smaller tribes tributary to him. Ijilli, a white mosque on an eminence a short distance from the beach, may be plainly seen from the offing.

The territory of the Buheishi tribe extends along the coast from Ras Rehmat to Fuwah in the bay of Makalla, a distance of 25 miles, with a vast district inland. The tribe is called collectively Buheishi, and is under one sultan, but is subdivided into four lesser tribes, each having its own name and chief.

The valleys inland are rich and beautiful, producing quantities of jowari; they are bounded by purple-veined mountains which rise from 5,000 to 6,000 feet above them, whose summits in the cold season are at times covered with snow.

Rain falls in November, December, July, and August, and sometimes heavy showers in April and May.

Supplies.—Good water is to be obtained at the town of Burum, also firewood, sheep, fowls, eggs, onions, and pumpkins. Tobacco and dates are the chief produce, and a brisk trade is done during the South-west monsoon, when Burum becomes a port of refuge.

Anchorage.—The best anchorage in the South-west monsoon season, is in from 5 to 7 fathoms, good holding ground, with the town of Burum bearing N.W., but a ground swell rolls in. H.M.S. *Seagull* was at anchor here from January to March, 1881, during the North-east monsoon, in 7 fathoms, close inshore, with the southern side of the town bearing W. by N., and the northern point of the bay N. $\frac{3}{4}$ E.; the wind never blew sufficiently strong to make the anchorage at all dangerous,

though at times the vessel rolled considerably. The current set continuously north-eastward, just outside the bay.

The coast from Radham bluff to Makalla, a distance of 14 miles, is low and sandy, with high mountains in the background. Along this part of the coast the depths are regular, the 20-fathoms contour-line being about one mile distant from the shore. As Makalla is approached, the beach becomes steeper.

Fuwah is a small town about half way between Burum and Makalla, containing about 500 inhabitants.

MAKALLA BAY may be said to extend from Ras Burum to Ras Makalla, but the name is more properly restricted to the eastern portion of the bight between Fuwah and Ras Makalla; in this part at $2\frac{1}{4}$ miles north-westward of Ras Makalla are two small bays, divided from each other by the point on which a portion of the town of Makalla stands, known as the eastern and western bays. Of these two bays, the western is the most frequented by boats; it is merely a small nook, with from one to 3 fathoms water, protected on the West by a reef almost dry at low water, which projects nearly half a mile from the shore; there is a sunken rock a short distance off the reef, with $1\frac{1}{2}$ fathoms water, requiring caution when standing towards it.

The eastern bay is seldom used, owing to the swell which rolls in during the North-east monsoon.

Climate.—The weather in the bay is exceedingly warm during the middle of the day, and on shore the heat is excessive. Land and sea breezes, with showers of rain, which tend to cool the atmosphere, are, however, occasionally experienced from October to April, and often in June and July.

Ras Makalla is a low neck of land projecting about 2 miles from the base of the hills, which here extend from the interior close down to the shore; it consists of three points, Ras Makalla, Ras Kodar, and Ras Marbat. Ras Makalla is the eastern point; about 3 cables southward of it is Ras Kodar, the southern extreme of the promontory; and 8 cables W. by N. from it, is Ras Marbat, with a ruined fort on it; about $1\frac{1}{2}$ miles farther north-westward lies the town of Makalla and the two little bays before described.

Rocky bank.—Southward from Ras Kodar, and distant from 4 to 6 cables, is a rocky bank $3\frac{1}{2}$ cables in length, rather steep-to, and with from $3\frac{3}{4}$ to $4\frac{1}{4}$ fathoms. The passage in-shore of it is said to be clear of danger.

The sea along the whole of this coast is remarkable for its clearness when calm and the water smooth, the bottom being then plainly visible in from 12 to 15 fathoms.

Anchorage.—The bank of soundings in Makalla bay on which anchorage may be obtained, extends about half a mile from the shore, near the town, increasing to nearly one mile off Fuwah. A vessel may lie here in perfect security during the North-east monsoon; a good position is about 2 cables from the point, and also from the reefs westward of the western bay, in from 7 to 10 fathoms, sandy bottom, with the flagstaff on the governor's house bearing from N.N.E. to N.E. The South-west monsoon blows home fresh, but, as the sun declines, the wind and swell decrease; often during the morning at this season it blows strongly from N.W.

Landing.—A stone jetty opposite the governor's house renders landing fairly easy.

Tides.—It is high water, full and change, at 8 h. 30 m.; springs rise 7 feet; the flood sets south-westward.

Makalla, next to Aden, the principal commercial town on the south coast of Arabia, is partly built on a narrow projecting rocky point, and partly at the foot of a range of reddish limestone cliffs rising to a height of about 300 feet immediately at the back of the town, on which are six towers for the protection of the place; it has a picturesque appearance from the sea. Almost directly above this remarkable level range of cliffs, the flat-topped summit of Jebel al Kara, the base of which is limestone and the upper half of beautiful white marble, traversed by blue and grey veins, rises 1,300 feet above the sea, and may be seen in clear weather at a distance of 42 miles. The northern portion of the town is built on ground sloping from the base of the hills to the bay, and is enclosed on the western side by a wall extending to the shore, with only one entrance gate. The governor's house is a large square building, the others are chiefly huts, intermingled with stone houses and two mosques. The houses on the point are of stone and are a better description of building.

Although the immediate vicinity of Makalla is particularly barren, yet this is not the case a short distance inland. At about one mile up the valley westward of the town there are large date groves and gardens belonging to the governor of Makalla, with watch-towers, occupied by his soldiery, to protect them from the incursions of the Bedouins. The gardens are irrigated by a stream of water led through them from a rivulet which has its source at a place called Bokharen in a rocky ravine of the mountains close by; the stream flowing from it is surrounded by date trees. The inhabitants of Makalla obtain their daily supply of water from this stream.

Makalla is ruled by a *pakib* or governor one of the Hamum tribe, who derives his revenue from customs, duties levied on imports, and harbour dues. The population is a mixed one, consisting of people of many nations.

See plan, No. 10.

Supplies.—Good water is to be obtained from the spring before-mentioned, but it is cheaper at Bander Burum. Firewood, bullocks, sheep, fowls, eggs, honey, and some descriptions of vegetables, are to be had in abundance, and are moderate in price. A quantity of fish may be taken with the seine in the western bay.

Trade.—A very considerable trade is carried on with India, the Red sea, and Maskat. The exports consist of gums, hides, large quantities of senna, and a small quantity of coffee. The imports are chiefly cotton cloths, lead, iron, crockery, and rice, from Bombay; dates and dried fruits from Maskat; coffee, jowari, and bajiri from Aden; sheep, aloes, frankincense, coffee, and dye from Berbera and other African ports. There is a considerable coasting trade carried on by means of vessels passing to and from the Persian gulf and Red sea, which remain here a few days to rest, according to the custom of Arab sailors, after being a short time at sea. The greatest number arrive during the date season, sometimes as many as twenty or thirty a day, of from 100 to 300 tons burthen, some with goods, others with pilgrims. Traffic in slaves exists. During the south-west monsoon, a considerable portion of the trade is carried to Bander Burum, which is then a more secure anchorage.

The Coast.—From the head of Bander Ruweini, the little bay on the eastern side of Ras Makalla, the coast trends E. by N. $\frac{3}{4}$ N. about 40 miles in an almost unbroken line of low sand as far as the cliffs of Hami. The soundings throughout are regular but deep, the 20-fathoms contour-line being generally one mile off-shore and the 100-fathoms line about three miles, with a bottom of sand and shells.

Bander Ruweini, the small bay north-eastward of Ras Makalla, has from 4 to 6 fathoms close in-shore, from whence it shelves into deep water. Native trading vessels find shelter here during the South-west monsoon.

Rukub, a village 2 miles eastward of the bay, has a large and ancient mosque. The inhabitants appear to be chiefly occupied in fishing.

Buweish, a village about 3 miles north-eastward from Rukub and $1\frac{1}{2}$ miles from the shore, stands in a well-watered valley, surrounded by date groves.

Shuhair, once a thriving town, is near the coast 13 miles eastward from Rukub. There is an old fort near the village, which is the most conspicuous object and the first seen on nearing the spot.

Suku-al-Basir is a town about 4 miles inland northward of Shuhair and said to contain 4,500 inhabitants. Its mosques may be distinctly seen from the sea. Tobacco, dates, and vegetables, with good water, are to be obtained here.

JEBEL DHEBA, an isolated oblong table-topped hill close to the shore, is a good land-mark for making Makalla from the eastward, from which place it is distant about 20 miles.

Zaghfa is a village on the shore 4 miles eastward of Jebel Dheba; 2 miles beyond it is the ruined village of Marir, where there is an abundant supply of water.

ASH-SHEHR, in long. $49^{\circ} 34'$ E. and 8 miles eastward of Jebel Dheba, the chief town of the district of this name, extends one mile along the shore; it has on an eminence a fortified castle, the residence of the jemadar, which is visible from seaward before any object in the town. Here is a mosque and a custom-house. The town is built in the shape of a triangle with high walls round it; the dwellings are much scattered. The population is about 6,000.

Supplies.—Water is bad. Sheep and vegetables may always be obtained.

Trade.—In 1880, Ash-Shehr had not much trade except in dried fish. The jemadar and merchants own several vessels, but the chief trade is carried on with vessels passing along the coast on speculation. The manufactures of the town are small, consisting principally of coarse cotton cloths and gunpowder.

Anchorage.—The anchorage off Ash-Shehr is an open roadstead. The best berth is in 7 or 8 fathoms, sand and shells, from 7 cables to one mile from the shore. Jebel Yucalif is an isolated hill 4 miles north-eastward of Ash-Shehr, on which are the remains of a wall and terrace. It is a good land-mark for making the place.

Eastward of Ash-Shehr, the soundings continue regular and the coast safe to approach, the 10-fathoms contour-line being about one mile from the shore and the 100-fathoms line from 3 to 5 miles.

HAMI, the next village, is 14 miles eastward of Ash-Shehr, and lies in a ravine at the foot of the dark double hill of the same name, with a date grove and cultivated ground about it. There is very little trade. Hot springs are numerous in the vicinity of the village, of which the temperature is about 140° Fahrenheit.

Anchorage about one mile off-shore may be had in 7 or 8 fathoms, sand, shells, and broken coral.

Supplies.—Water here is indifferent and supplies difficult to obtain, sheep and vegetables being the only articles procurable.

SHARMA BAY.—Between Hami and Ras Sharma, 9 miles farther eastward, the coast forms a bay receding 2 miles, with sandy bottom and regular depths. Near a small point in the bay and on a rocky eminence half a mile inland, stands the ruined fort of Husnal-Museinaa; and

between this point and Ras Sharma is Sharma bay, considered the best in this neighbourhood during the North-east monsoon.

Ras Sharma is a small headland forming the eastern limit of the bay. At 3 cables westward of it lies Jezirat Sharma, a small rock 70 feet high. The channel between is 340 yards wide, having 5 and 6 fathoms water and deepening towards the rock. Immediately northward of the cape is a hill named Mashar-Sabir, 170 feet above the sea.

Anchorage.—Very good anchorage may be found in Sharma bay in 4 or 5 fathoms, with Ras Sharma bearing S.S.E. 5 cables; but that most frequented is off the village of Al-karn, near the head of the bay, where small vessels may lie perfectly secure in from 2 to 4 fathoms water.

Tides.—It is high water, full and change, in Sharma bay, at 9 h.; springs rise 8 feet; the flood sets westward.

Dis is a walled town 2 miles inland from the head of Sharma bay; 3 miles farther inland is the village of Thubba. Both of these places are noted for their hot springs, which are of peculiar efficacy in rheumatic complaints.

The Coast.—From Ras Sharma the coast trends E. $\frac{1}{2}$ N. 8 miles to Ras Baghashwa, presenting a succession of limestone and chalk cliffs rising almost perpendicularly 300 and 400 feet above the sea, and visible from a distance of 25 miles. The shore throughout is bold, there being in some places 5 and 6 fathoms water within a few yards of the cliffs; the bank of soundings extends $5\frac{1}{2}$ miles off-shore, and the 20-fathoms contour-line is 2 miles distant from it.

Ras Baghashwa, a rocky point 300 feet high and the eastern termination of this part of the coast, has on it the ruins of an ancient town; they are close to the cliff and cannot fail to strike the eye of those sailing along the coast. The small village of Baghashwa is a little eastward of the Ras, and at 4 miles westward, in a gap in the cliffs fronted by a sandy beach, is the village of Dhafghan, off which is an anchorage for boats. About 5 miles inland is Jebel Hamún, a sand-hill, in the vicinity of which are some curious ancient inscriptions in the same character as those of Husn Ghoráb. There are several springs of good water here and the land is well cultivated.

Aspect.—A high range of mountains extends parallel with the shore from 10 to 15 miles inland. Commencing eastward of Makalla, they bear the name of Jebel Jambúsh, then Jebel bin-Shamayik, and a remarkable bluff towards its eastern end is to be seen on a still more distant range; next follows Jebel Asid (mount Lion), which stretches away north-eastward towards Ras Farták.

From Ras Baghashwa to Ras Kosair, a distance of 13 miles, the coast trends in an E.N.E. direction, and is low and sandy. The soundings are regular; the 20-fathoms contour-line being about 2 miles and the 100-fathoms line about 6 miles distant from the shore, the bottom generally being sand and shells.

Hamum tribe.—The territory of the Hamum tribe extends along the coast from Fuwah to Museinaa, in long. $50^{\circ} 40' E.$, a distance of about 100 miles. The tribe is subdivided into ten clans, each having its own name and separate chieftain; but, collectively, they are called Hamum, and are under the dominion of the sultan.

RAS KOSAIR is a low rocky point with two small rocky islets close westward of it. A reef, partly dry at low water, extends south-eastward from these islets to a distance of 4 cables off Ras Kosair. Boats find shelter within this reef; there is also shelter for boats behind a reef about three quarters of a mile north-eastward of the point.

There is good anchoring ground off Ras Kosair reef in 12 or 14 fathoms, but with no shelter from the wind.

One mile northward of the point is Kosair village, containing a few stone buildings but consisting chiefly of huts. The inhabitants have some few boats and catch abundance of sharks, the tails and fins of which, when dried, they export to Maskat and Bombay, from whence they find their way to the Chinese markets, fetching good prices.

Half a mile north-westward of the village is a ruined square fort and a date grove; and $1\frac{1}{2}$ miles farther westward is the scattered hamlet of Al Kúrain.

The coast from Kosair trends east-north-eastward with a slight inward curve for about 30 miles; it is low, sandy, and uncultivated, presenting a dreary appearance. The soundings are irregular, the bottom being rocky, with sudden overfalls; the lead, therefore, affords no guide. The round tower at Harrah, a small village 4 miles north-eastward of Kosair, is conspicuous. Serrar or Raida Seghir, is another small village $2\frac{1}{2}$ miles farther on, with abundance of date trees near the houses. Husn-el-Kathiri is a ruined fort, 2 miles inland and 3 miles westward of Raida.

Raida, a small town about three-quarters of a mile inland, is the principal place on this part of the coast, being the residence of the chief who rules over the Kusaidi clan of the Hamum tribe; his territory extends from Ras Baghashwa to Museinaa. There are several trading boats belonging to the place. The exports are frankincense, aloes, ambergris, and sharks' fins and tails. The population is about 700.

There are many hot springs here which are said to possess great medicinal virtue; and, from the number of places and ruins, and from the

cultivation which accompanies the presence of water here, this is probably, next to Dhofar, the most fertile part of the coast.

The soundings off Raida are deep, and there is no safe anchorage, there being 20 fathoms water within a quarter of a mile of the beach. Opposite the town of Raida, and close to the shore, there is a deep hole with from 120 to 135 fathoms water, and with from 20 to 40 fathoms round it.

Among the most remarkable features on this coast are a series of horizontal effusions of black basalt, on the plain between the neighbourhood of Raida and Wadi Masaila. These are three in number, and are called *harik* or burnt place by the Arabs. Each is accompanied by one or more cones about 100 feet above the level of the surrounding ground; and, around each cone, for a variable extent, is a low field or tract of basalt, so strikingly defined by its blackness and the light colour of the plain over which it has spread, that, but for its being unattended by any active signs of volcanic eruption, it might be taken for a semi-fluid mass of lava.

In the centre of the first tract, which is in the vicinity of Raida, are four cones; and this effusion having taken place over ground for the most part 100 feet above the level of the sea, has found its way into the watercourses and appears at their openings on the shore in black rocks, contrasting strongly with the white colour of the limestone on each side. The plains of the lower mountains here also appear to be darkened, perhaps by ashes ejected from the cones or craters. There is, of course, hardly any trace of vegetation, and the heat from it in the month of May is almost insupportable.

The next cone is opposite Wadi Sheikhaur, about 9 miles from the last and about 3 miles inland.

The last cone is about 4 miles westward of Sihut. Its effusion has extended nearly to Wadi Masaila on the East, and joins with that of the cone on the West.

Connected with these volcanic effusions appear to be Abd-al-Kuri or Palinurus shoal, and the deep hole, already described, off Raida. Such irregularities in the bottom of the sea do not exist elsewhere throughout the whole extent of this coast.

Museinaa is an old ruin on the shore 12 miles eastward of Raida; the land about it is swampy and abounding in mangrove trees. The remains indicate the site of a large town.

This is a most interesting portion of the coast, containing as it does so many ruins and ancient inscriptions, which bear record of former greatness. The country, which was probably fertile and populous, is now almost desolate, and the few inhabitants are nearly always at strife with their neighbours.

Wadi Sheikhaur, a valley 10 miles inland, is easily distinguished by a remarkable gap in the mountains that encompass it; several inscriptions similar to those of Husn Ghoráb, &c., are to be found here.

PALINURUS SHOAL, or **Abd-al-Kuri**, is a dangerous patch of rock and coral, one mile in length, off Museinaa; from the shoalest spot of $2\frac{1}{2}$ fathoms, the ruin at Museinaa bears N. $\frac{3}{4}$ W. about $8\frac{1}{2}$ miles, and nearly in line with the eastern bluff of Sheikhaur gap, which lies fairly open; the sandy beach of the mainland is not visible from the shoal.

Caution.—It is advisable to avoid this spot entirely, either by keeping well in-shore or by keeping a good offing of from 12 to 15 miles. The soundings round the shoal vary suddenly and do not always decrease on approaching it. On its western and northern sides, there appears to be a narrow gut of deep water of 140 fathoms, with from 40 to 80 fathoms close to it.

The coast between Museinaa and Ras Ekab, a distance of about 42 miles, is low and dreary, with a gradual ascent to the Sheikhaur mountains, their eastern termination in Jebel Asid forming the western side of Wadi Masaila. At 12 miles eastward of Museinaa is the village of Tanún, and 12 miles farther on is the deserted village of Sharkhut.

The depths off this part of the coast are regular and the shore safe to approach; the 20-fathoms contour-line is about 5 miles, and the 100-fathoms line from 10 to 18 miles from the shore.

Wadi Masaila is a valley 6 miles wide, having on its western side the high range of Jebel Asid, and on its eastern side the high range which terminates on the coast at Ras Ekab; it forms the line of communication between the sea-port towns and the province of Hadramaut. On each side of the entrance is the ruin of a fort. The valley is well watered by running streams, and villages and date groves are numerous; the inhabitants are of the Mahra tribe. Wadi Masaila is certainly the grandest of all the valleys of this coast which open upon the sea; and, running inland, it seems to divide the mountainous land of Southern Arabia into separate tracts. Its width and the height of its sides appear enormous, and its summits are usually cloud-capped.

SIHUT is a large, well-built, and cleanly kept town, situated 35 miles eastward of Museinaa, 8 miles westward of Ras Ekab, and lies south-eastward of Wadi Masaila. The scattered stone buildings in the neighbourhood have evidently been erected as places of defence against small arms. Its population, of the Mahra tribe, varies according to the trade and season, and is estimated at times to number 10,000. Considerable intercourse with the interior takes place through Wadi Masaila, and there is a great trade carried on in fish oil to the Persian gulf. Steamers of the Persian

Gulf Company call here occasionally, also small steamers from Aden. About 4 miles westward of Sihut is the village of Darfut, with a date grove.

The traders of Sihut have several coasting craft with which they carry on a trade in grain; the smaller boats are also employed in shark fishing.

Supplies, such as sheep, fowls, milk, and eggs, are plentiful and cheap.

Anchorage.—The anchorage off Sihut is an open roadstead; the soundings are regular, and depths of from 7 to 9 fathoms extend some 4 miles off-shore, with a sandy bottom. A good berth in $5\frac{1}{2}$ fathoms, mud, is with the large white house in the town bearing N.W., and Ras Sharwein just open of Ras Ekab.

Ras Ekab is a high, red, sloping, rocky point; between this point and Ras Atáb, a distance of 8 miles, are three bluffs, nearly equidistant, forming small bays with sandy beaches, some of which afford shelter for small boats in the North-east monsoon. A few fishermen live in different spots along the coast.

RAS ATÁB is moderately high, but terminates in the low point which forms the western boundary of Bander Liban.

Atáb.—At 2 miles north-eastward of Ras Atáb, and one mile from the beach, is the town of Atáb, having three mosques, of which the western one has a minaret. The population is about 400. The town is under the government of Kishin. At one mile westward of the town is a date grove, and to the eastward is a well of good water.

Bander Atáb or Liban, has regular depths, and at its eastern limit, under Ras Sharwein, affords shelter from north-easterly winds. With a fresh sea breeze, there is considerable surf on the beach. The shore of this bay is sandy, gradually ascending from the beach; in some parts, the sand is blown high up against the face of the hills, one remarkable black peak showing itself through the sand.

Except a few trees on the summit and sides of the mountainous tract between Ras Sharwein and the neighbourhood of Raida and Ras Baghashwa, the whole coast is barren and uncultivated.

RAS SHARWEIN, separating Bander Atáb from Kishin bay, is a high, dark, perpendicular cliff; the highest peak, 750 feet above the sea, is about 2 miles from the point, gradually sloping towards the sea in the form of a gunner's quoin, and terminating in cliffs varying from 80 to 150 feet in height; see view on chart. About $2\frac{1}{4}$ miles westward of the point are two remarkable sugar-loaf peaks close together, commonly known by the name of the Ass's Ears; they may be seen at a distance of 30 or 40 miles, but do not show their characteristic feature when bearing

See chart, No. 10b.

eastward of North. The point is bold, there being deep water close under the cliffs.

KISHIN BAY is formed by the projecting headlands of Ras Sharwein and Ras Darja, 13 miles apart. The depths are regular, there being from 8 to 10 fathoms water nearly 2 miles from the shore, gradually decreasing towards the beach. During the North-east monsoon, there is a heavy ground swell and a high surf on the beach, which renders landing dangerous, except immediately westward of Ras Darja, where there is a nook, in which the small trading boats land their goods. The shore of the bay is low and sandy near the sea, having a high range of hills in the background, with a barren tract of undulating sand-hills intervening.

Anchorage.—The best anchorage is in Bander Lask, the western part of Kishin bay, in about $4\frac{1}{2}$ or 5 fathoms, half a mile from the shore, with the Tomb bearing West, and the extreme of Ras Sharwein S.S.E. ; here vessels are well sheltered from the South-west monsoon and lie in comparatively smooth water. In other parts of the bay, a heavy swell rolls in at that season.

KISHIN is a large straggling town at the head of the bay and about quarter of a mile from the beach. It is one of the principal ports of the Mahra tribe and the residence of the sultan, who was formerly also nominally sultan of Sokótra, but he placed that island under British protection by treaty in 1886.

The population is small, and they have only a few trading and fishing-boats. A small trade is carried on with the Persian gulf, Zanzibar, and the western coast of India. To Zanzibar and Maskat they export salt and dried fish ; to India, they principally send money ; in return, they import from those places, jowari, rice, cotton cloths, dates, coffee, and sugar.

The village of Suk, near which is a small khor or lake of salt water and a few date trees, is $2\frac{1}{2}$ miles eastward of Kishin ; and, $1\frac{1}{2}$ miles farther on is Hafat, another small village.

Fish are plentiful off the coast, and of excellent quality ; they form the staple article of food with the natives.

Supplies.—It is almost impossible to get supplies of any kind at Kishin. Fish can be caught in large quantities in Bander Lask, but cannot be bought.

Water.—Good water is procurable at Kishin from a well westward of the town.

RAS DARJA, the eastern point of Kishin bay, is a precipitous point varying from 200 to 400 feet in height. The sea is blown against it with great force during the South-west monsoon, forming large caves at its base, which is of limestone formation. The point is bold, having

See chart, No. 106, with plan of Kishin bay.

5 fathoms water close to the cliffs, which extend from the extreme of the point to the beach on either side.

Anchorage.—A sunken rock lies $3\frac{1}{2}$ miles north-eastward of Ras Darja and about 8 cables from the shore. Between the rock and Ras Darja there is complete shelter and good anchorage during the South-west monsoon.

The Coast.—From the cliffs of Ras Darja to those of Ras Farták, a distance of 25 miles nearly in a straight line in an E. by N. $\frac{3}{4}$ N. direction, the shore is low and sandy, sand-hills rising gradually towards the interior, and having a high range of hills in the background; the whole is barren, with the exception of a few stunted bushes and some small patches of cultivation near the villages.

The depths off this part of the coast are regular, the 10-fathoms line being about one mile from the shore; the 100-fathoms contour-line is about 20 miles off-shore at Ras Darja, but decreases its distance to 6 miles off Ras Farták.

Sakr is a straggling village in a date grove close to the beach about 8 miles eastward of Ras Darja, with a population of from 500 to 600. On some low cliffs south-westward of it stands a large white mosque. A considerable quantity of grain is grown in the vicinity. An abundant supply of good water is to be obtained here.

Haswein is a village with some date trees near, about 9 miles eastward of Sakr, and containing 500 inhabitants, who principally depend on fish for food; they also carry on a small coasting trade in fish. Good water is to be obtained here in abundance.

Kesid is another fishing village at the base of the high land on the western side of Ras Farták containing about 150 persons. It has no trade of its own and the inhabitants are miserably poor, but off this village is the usual anchorage for boats trading with the inhabitants of the small valley on the western side of Ras Farták, and this district includes the town of Wadi and other villages, as presently described.

At $1\frac{1}{2}$ miles from the beach are some date groves, with the villages of Dhekrabait on the eastern side and Kadifut on the western side of them, each containing about 300 inhabitants. There are several wells of good water, and the land is slightly cultivated; there are also two small salt-water lakes in the vicinity, from which the natives make salt for exportation.

WADI, one of the strongest towns of the Mahra tribe, and having three or four forts for its protection, lies about three hours' journey from the landing place at Kesid, following the valley at the western foot of the Farták mountains. The population amounts to about 600 souls;

they are wealthy for Arabs, but, in common with the whole of the Mahra tribe, bear a bad character and are not trusted by the trading Arabs.

Wadi is a place of considerable trade and its people own several coasting craft, its port being Kesid, before mentioned; they carry on a trade with Mangalore, Maskat, and Zanzibar, touching at other ports on their way. The principal exports are salt, salt fish, and shark fins. The imports are rice and cotton cloths from India; staves, tobacco, and wood for building boats, rafters from Zanzibar and the African coast; and dates from Maskat.

It was, formerly, the largest slave-dealing town on the coast; great numbers of slaves being imported annually and sold to their own and other tribes.

RAS FARTÁK, in lat. $15^{\circ} 38' N.$, long. $52^{\circ} 15' E.$, is bold and safe to approach, there being 9 and 10 fathoms water close to the cliffs, 20 and 30 fathoms at one mile, and 100 fathoms about 6 miles from the shore. It is a lofty mountainous headland about 2,500 feet above the sea and visible at the distance of 60 miles on a clear day; next to Ras Sakar, it is the highest and largest promontory on the coast. The sea-cliff, which at Khalfut, 12 miles to the northward, is about 50 feet above the sea level, increases rapidly in height with the land and soon arrives at a perpendicular escarpment of 1,900 feet, a height which it maintains onwards to the summit of Ras Farták. It is by far the grandest escarpment on the south-eastern coast of Arabia, being uninterruptedly perpendicular from top to bottom for an extent of 6 miles.

No part of this range has any vegetation except near the summit, and this chiefly on the western side where the range slopes gradually to the plain below. Indeed the barrenness of the Farták range generally, as well as that of the land side, seems to indicate that this part of the coast does not catch the rains of the South-west monsoon.

From the extreme of the cape, the cliffs extend in a northerly direction for about 8 miles, they then become lower and irregular for a farther distance of 9 miles, when they end in the sandy beach off the village of Tabut, the rocky projections forming several small bays with deep water.

When about 30 miles off Ras Farták in a southerly direction, it appears like an island with a gap in the middle. It is supposed to be the ancient Syagros, from its resemblance to a boar's head when seen at from 20 to 30 miles, either from West or East.

The Current which begins to set E.N.E. along the south-east coast of Arabia early in April, is apparently deflected at Ras Farták, and strikes the coast again about Damkut in the Ghubbet Kamar; its average strength is 2 miles an hour. During the North-east monsoon it runs in the opposite direction at the rate of one mile an hour.

GHUBBET KAMAR.—At Ras Farták the coast takes a sudden turn northward for about 40 miles, when it curves away in an E.N.E. direction for about 80 miles to Ras Sakar, forming the extensive bay Ghubbet Kamar, which recedes from a line connecting the two capes about 28 miles. From the high land of Farták the shore is low near the beach, with high land in the interior, for about 45 miles, until near the village of Al-Jowhari in the vicinity of the Falik mountains, eastward of which mountains is the high range of Jebel Kamar, varying in height from 3,000 to 4,000 feet, and approaching close down to the sea.

The soundings in Ghubbet Kamar are generally deep and irregular. Off the low sandy shore at the western end, the 10-fathoms line is about $3\frac{1}{2}$ miles from the shore, and the water deepens to the 100-fathoms contour-line at about 13 miles from the beach. But, as the high land of Falik is approached, and from thence to Ras Sakar, the water becomes very deep and the coast dangerously bold, in some parts there being no bottom at 100 fathoms within a mile of the shore; consequently there is no safe anchorage for vessels, neither is there any place of shelter for vessels of any size along the whole extent of the coast.

Supplies.—Bullocks and sheep are generally plentiful at all the villages in Ghubbet Kamar. Vegetables are not procurable, and there are scarcely any signs of cultivation to be seen.

Weather.—From about the middle of June, the South-west monsoon blows strongly with a heavy sea; the premonitory swell of the monsoon commences to roll into the bay early in the month of April, causing a very heavy surf on the beach. During this season, most of the people retire to the mountains. Rain is uncertain, sometimes falling in abundance, but often the season passes without any. As a general rule, the winds, except as stated, are light and variable in the bay.

Ras Fintás, the first headland northward of Ras Farták and distant 9 miles from it, is a bluff about 200 feet high, having immediately over it a conical hill named Fintás peak. At this point, the high land leaves the shore and trends far away north-westward. At 2 miles northward of Ras Fintás there is a low bluff point forming the northern boundary of a small sandy bay in which is the village of Nishtun.

Northward of Nishtun is a bay in which is Khor Khalfut, a creek about 2 cables in length, with 6 feet water. Boats of 30 and 40 tons are hauled up here during the South-west monsoon. There are a few temporary huts occupied by the crews of the boats when laid up.

From Khor Khalfut the coast trends northward 20 miles to Al-Ghaidtha, the largest town in the bay and about one mile from the beach. The small villages of Tabut, Herut, and Heraiyak are on this part of the coast, but about a mile inland. Between the first two, and about 3 miles from the beach, is a small saddle hill.

From Al-Ghaidha the coast trends north-eastward about 20 miles to Al-Jowhari, a white tomb 3 miles from the beach with a few huts near it. The intermediate shore is also low, and about midway is the village of Eirub. About 3 miles southward of Eirub, and close to the sea, are some date trees and Kabr Khaihul tomb.

Between Khalfut and Eirud the 10-fathoms line of soundings is about 3 miles off-shore; the depths then rapidly increase to 20 fathoms, and from thence off into deep water. In this part of the bay very weak tides prevail, but they are accompanied by strong rippings, which are rather alarming to persons unacquainted with their existence.

The Falik mountains come close down to the sea 9 miles eastward of Al-Jowhari, and from thence trend in a W.N.W. direction until they join the Farták range; their average height is about 2,000 feet. From the point at which they reach the shore, the coast runs in almost a straight line to Ras Sakar, the mountains rising abruptly from the sea, with occasional small patches of sandy beach.

Wadi Shaghut is the valley between the Falik and Athub ranges of mountains, the former terminating in a sand-hill, the latter in a dark bluff point. Off this place, the bank of soundings extends 7 miles, with overfalls near the edge. There are 10 fathoms water within half a mile of the shore.

DAMKUT, the only seaport in Ghubbet Kamar, is a town in a valley at the western extreme of Jebel Kamar on an irregular plain about a mile square, and bounded on all sides, except the sea, by almost inaccessible mountains. A reef of rocks on which the sea breaks extends 250 yards from the shore; on the eastern side of this reef, there is good landing when the south-westerly swell is not very heavy, though at the same time the western side may be almost unapproachable. On the western side of the plain is a salt-water khor, with a few date trees round it, and on a cliff immediately over the town stands a ruinous fort. The town consists of about 90 mud houses, with a population of about 400 people; and there is a very extensive burial ground here. They have a small export trade in ghi, hides, and gums; and they possess about 40 small boats rudely sewn together, in which they are chiefly employed shark fishing during the fine season.

Mahra tribe.—This is the eastern limit of the coast line of the Mahra tribe; between it and Ras Turbat Ali, 14 miles eastward, the ground is said to be neutral and inhabited both by Mahra and Garra.

The Mahra tribe, so frequently alluded to, is very numerous and powerful, its territory extending along the whole coast from Muscinaa to Damkut. Their chief is the Sultan of Kishin, at which place he resides. They are an extremely bold and hardy race, but are crafty and

treacherous, and are not trusted by the trading Arabs. Collectively, they are under the rule of the sultan, but are subdivided into four branches under distinct chieftains, which are again subdivided into clans, each clan having its sheikh.

From Damkut eastward, the bank of soundings becomes very narrow and steep, there being no bottom in some places at $1\frac{1}{2}$ miles from the shore, and from 7 to 10 fathoms close to.

Jodab, a village built under some projecting rocks, is 9 miles eastward of Damkut. About 2 miles farther on is **Hauf**, a village and tower, the residence of a sheikh. **Ras Tarbat Ali** is a small rocky point about 200 feet above the level of the sea, having over it a bluff on the high range 3,950 feet high, which is very conspicuous from the south-westward; from the south-eastward, it is not distinguishable.

From **Ras Tarbat Ali** eastward, the coast is inhabited by the **Garra** tribe. **Thalfut** is a grove of date trees 10 miles eastward of **Tarbat Ali**. There are large numbers of cattle in this locality. **Kharfut**, a very fertile valley, is 5 miles eastward of **Thalfut**.

Rakhuit is a small village 11 miles westward of **Ras Sakar** in the **Khais-bin-Umar** valley; which valley produces abundance of limes and tamarinds. A petty sheikh resides here. **Khaisat-bin-Othman** is a similar valley 4 miles farther eastward, with a small village named **Safut** at its entrance.

From **Khaisat-bin-Othman** to **Ras Sakar**, the mountains rise like a wall from the sea, and the soundings do not extend more than one mile from the shore, falling off suddenly from 35 fathoms to no bottom at 120 fathoms. The whole range of mountains from **Damkut** is comprised under the general appellation of **Jebel Kamar**, and although sterile in appearance at a distance, they are clothed with wood from base to summit.

RAS SAKAR, in lat. $16^{\circ} 44\frac{1}{2}'$ N., long. $53^{\circ} 34'$ E., is a high, steep, and rounded cape, rising in three steps from the sea, the highest of which is a perpendicular bluff 2,770 feet high; the summit of the cape is a level table-land 3,380 feet above the sea. The eastern side of **Ras Sakar** is perpendicularly scarped, but is not so high as the south-western on account of the strata dipping towards the east. The south-western side is not perpendicular, but descends in three or four grand steps to the sea, of which the ledges are so narrow that the summit may be seen when only half a mile distant from the base. The bluff extreme of the cape is perpendicular to the water's edge; it is steep-to, there being no soundings at 100 fathoms within one mile of it.

The Coast.—From **Ras Sakar** to **Ras al Himar**, a distance of 24 miles, the coast is rocky and irregular, forming a slight curve named **Ghubbet Fazaiya**, in which the soundings are still deep, but extend to a

See chart, No. 10b.

much greater distance seaward than off and westward of Ras Sakar, the 100-fathoms contour-line being 9 miles off-shore; close in-shore the depths are from 10 to 11 fathoms. Near the western end of the bay is a rocky islet near the shore, with deep water all round.

Ras al Himar, or Red cape, is a rocky bluff point, formed of red irregular hills, projecting from the high mountain range which skirts the coast. On the summit of the bluff is a remarkable needle peak with a notch between it and a smaller peak.

RAS REISUT is a bluff rocky point about 100 feet above the sea, 4 miles eastward of Ras al Himar. On its extreme are the remains of a small round tower, and farther in, on the ridge, is an ancient burial ground extending over an area of three acres. Close eastward of the point are three rocky islets. Ras Reisut is the western boundary of the low land of Dhofar and the southern point of Bander Reisut; it is composed of the white and grey limestone of the coast, and is much scarped and very irregular near its summit from denudation.

Bander Reisut is a small bay immediately northward of Ras Reisut, affording excellent shelter during south-westerly or westerly winds, with good anchorage in from 4 to 5 fathoms water. A white rock lies close to the shore one mile N.W. by N. from the cape; the anchorage is about on this line and at 4 cables from the cape. In-shore of this line, the water quickly shoals to 3 and 2 fathoms and becomes very shallow all round the bay as the beach is approached.

Water.—There is a well of indifferent water half a mile from the beach.

The Coast.—From Bander Reisut, the coast again takes an easterly direction for 40 miles to Merbat bay. It is low and sandy until within 16 miles of Merbat, when cliffs about 100 feet in height again prevail. Off the low portion of the coast, the depths are regular and extend some 13 miles off-shore, there being 100 fathoms water at that distance; there is good anchorage in from 5 to 7 fathoms at 7 or 8 cables from the beach. The coast is backed by Jebel Kamar and Jebel Samhan, a range of mountains from 3,000 to 4,000 feet high which skirts the coast and terminates at Ras Nus.

The appearance of the coast from Reisut to Diriz is pleasing to the eye, presenting a succession of green fields, cocoa-nut groves, and buildings, with the high range of mountains in the background. Eastward of Diriz, all traces of cultivation are lost, the ground being swampy and covered with mangrove for a distance of 14 miles, until the village of Thaka is reached.

Between Thaka and Merbat is a succession of limestone cliffs about 100 feet in height, the high range of Jebel Samhan sloping down to within

See chart, No. 10*b*, with plan of Bander Reisut.

one mile of their edge. The coast here is bold, there being 10 fathoms water within half a mile of the cliffs.

The inhabitants for the most part dwell in natural caverns, some of which are of enormous size; and, as these are generally situated on the precipitous portions towards the sea, their position may sometimes be distinguished when night comes on by their lights.

DHOFAR PLAIN.—The extensive plain of Dhofar is bounded on the west by the high land of Ras al Himar, on the east by Jebel Samhan near the village of Thaka, and on the north by the curve of the hills. It is the most extensive of the lowland tracts that intervene between the sea and the mountains, which in the central part recede 10 miles from the shore. It possesses a rich arable productive soil and an abundant supply of fresh water, and is one of the most fertile districts on the south coast of Arabia. The governor, and his garrison of 200 men, reside at Salala.

The towns of Dhofar are congregated about its centre, near the sea, probably for mutual protection. They are six in number, viz., Diriz, Robat, Salala, Al-Hafa, Abkad, and Okkad. The first four are situated around the ruins of an ancient city on the sea-shore, now called Al-Bilad. Robat is a little distance inland towards the mountains and has been deserted on account of the constant predatory visits of the Garra tribe. Okkad and Abkad are on the shore a few miles westward of Salala.

During the South-west monsoon, the wind, waves, and sand are said to render Dhofar so disagreeable that the principal inhabitants retreat to the mountains. The plain, after the rains, is said to be covered with an incredible number of sheep and cattle. Of horses, they have scarcely any.

In several parts of the plain there are ruined towns like that of Al-Bilad, *see* page 484. They are six in number, and are said to have been built by the Min Gui.

Frankincense and gum-arabic trees abound on the mountain slopes in the interior, as well as many other medicinal gums, which might be collected in large quantities; but the trade is small, owing to the want of some safe place of exchange or sale.

Okkad is a small village 4 miles northward of Ras Reisut and about half a mile from the beach, containing about 120 inhabitants; round it is a little cultivated ground and some cocoa-nut trees; near it is a salt-water lagoon. There are several wells of good water in the village.

Abkad, another small village, is one mile eastward of Okkad and half a mile from the beach, with about 80 inhabitants who possess some fishing-boats. There is a fresh-water lake in the vicinity.

Salala, a town containing about 600 inhabitants, is nearly 3 miles from Abkad and $1\frac{1}{4}$ miles from the shore; it is surrounded by groves of cocoa-nut trees and cultivated ground, giving the coast a fresh green appearance from seaward; there is a white fort on the beach opposite the town. There are a lake and several wells of good water here.

Al-Hafa, a town nearly one mile south-eastward of Salala and close to the beach, contains about 600 inhabitants who possess a few fishing-boats; it is surrounded by groves of cocoa-nut trees and well-cultivated ground, and has several wells of good water.

Al-Bilad.—One mile eastward of Al-Hafa, and separated from it by richly cultivated ground, are the extensive ruins of Al-Bilad, close to the beach, spread over an area 2 miles in length by 600 yards in breadth; near, but eastward of it, is a deep khor of fresh water thickly covered with bulrushes. The situation may be known by the high mound formed by the ruins at the eastern end of the large grove of cocoa-nut trees.

Water.—There is good water to be obtained here, and at all the villages on the coast of Dhofar; but owing to the surf which rolls in on the beach it is dangerous for crews of vessels to fill their own casks in ships' boats; the natives will bring out the water in their fishing-boats. A constant supply of small casks should be sent to the shore, as the natives are lazy, and not easily induced to recommence work after once leaving off.

Robat is a deserted town close to the northern edge of the khor, with a mosque, the wall of which is built of stone; on the pulpit is an inscription with the date of its erection Ann. Hej. 1232, built by Abdul-Sheikh-bin-Taujah.

Diriz, a small town 4 miles eastward of Al-Hafa, and close to the beach, is, like that village, surrounded by cultivated ground and groves of cocoa-nut trees. Round the town are several watch-towers within range of each other, for its protection. There is a khor of salt water immediately to the eastward, and 2 miles beyond are the ruins of a fort.

Thaka is a small village built of mud and stones with a population of about 350 souls; it is close to the shore, which here consists of limestone cliffs 100 feet in height at the foot of the mountains which slope down to within one mile of the shore. Westward of the village are groves of cocoa-nut trees and some cultivated ground. There are two fresh water khors, and one (Khor Reiri) salt; the latter is probably fresh at its upper part, but near the coast it is very brackish and there is a perceptible tidal rise and fall; it is separated from the sea by a narrow ridge of sand, and it is said that formerly boats could enter it.

Supplies.—Good water and bullocks are to be obtained here.

MERBAT BAY is on the northern side of Ras Merbat and affords complete shelter from all winds but those between South and West, and good anchorage in from 7 to 9 fathoms, with Ras Merbat bearing S. $\frac{1}{4}$ W. about 7 cables. Jebel Doa-an, presently described, bearing N. by E. or eastward of that bearing, is a good mark for identifying Merbat. The eastern shore of the bay is an extensive sandy plain, on which appear a few hills of moderate height.

Ras Merbat, a low rocky point, is the south-western extreme of the low belt of land extending from Jebel Samhan to the sea. A reef extends westward 2 cables from the point, with from 8 to 10 fathoms water close to its edge and 20 fathoms 2 cables from it.

Merbat town or village is near the centre of the bay, close to the beach, and about three-quarters of a mile northward of the cape; it consists of mud and stone houses with a population of about 300 people, who are inclined to be friendly, and is subject to the Sultan of Mascat, who keeps a small garrison here. Northward of the town is a tomb. Around the houses are ruins of others of a more ancient date, from which the newer ones appear to have been constructed. This is commonly the case with the villages on this coast.

Merbat is the principal trading town of the province of Dhofar; the exports are frankincense and gum-arabic, which is collected here from the Bedouins and varies very much in quantity. The trade is mostly carried on by barter, they receiving rice, dates, cotton, cloths, &c., in exchange for their gums. The sheikh levies a duty on all exports and imports.

Landing is impossible here in the South-west monsoon.

Supplies.—Very indifferent brackish water, firewood, and a few bullocks and goats may be obtained here. Merbat is a common place for vessels sailing along this coast to water at, although the water is so brackish that it is hardly drinkable to those who have been accustomed to better. About 4 miles westward of Merbat, there is a mountain rivulet of excellent water, at which, descending as it does to within a few hundred yards of the shore, vessels are enabled to replenish their tanks.

Tides.—It is high water, full and change, at Merbat, at 9h.; springs rise 7 feet.

Jebel Doa-an, or Merbat peak, 3,690 feet above the sea, is the western brow of the high limestone range of Jebel Samhan, which, as before mentioned, skirts the shore between Ghubbet Kamar and Ras Nus. It is the best landmark for making Merbat; the peak is nothing more than an elevated part of the mountains, from which they rapidly decline in height to the westward, thus rendering it a conspicuous object from the sea.

See plan of Merbat bay, on chart, No. 106.

The Coast.—From Ras Merbat to Jebel Jenjeli, a distance of about 20 miles, the coast is low, rocky, and irregular, with several small sandy bays, rocky points, and isolated rocks close to them. It is backed by the high mountain range of Jebel Samhan; *see* view on chart. The soundings are very deep, there being 30 and 40 fathoms water about a cable's length off-shore, and 100 fathoms within a quarter of a mile.

Bander Jenjeli is a sandy bay immediately under the high conical hill bearing that name. It is $2\frac{1}{4}$ miles wide at the entrance and $1\frac{1}{4}$ miles deep, affording shelter from easterly and north-easterly winds, but open to the southward. This bay has irregular soundings, varying from 8 to 12 and 16 fathoms, with overfalls; the bottom is rock and sand. In the centre, on a line drawn from point to point, there is a depth of 26 fathoms, with deeper water immediately outside.

Jebel Jenjeli is a remarkable conical hill 1,300 feet high and close to the sea; it is composed of limestone traversed by veins of chalk and gypsum.

From Jebel Jenjeli, the coast commences to trend more to the northward, and at 15 miles north-eastward of it is Jebel Musaira, of similar formation, with a rocky irregular coast between them; and 6 miles farther, immediately over Ras Nus, is Jebel Nus, presently described. Between Jebel Musaira and Jebel Nus is a small valley with a little brushwood; otherwise the same rocky irregular outline of the coast extends to Ras Nus, with deep water close to the shore the whole way.

The belt of low land between the mountains and the sea from Merbat to Ras Nus, a distance of about 36 miles, is named Sellha. The whole is extremely desolate, there being no visible sign of vegetation, yet antelopes and hares manage to pick up a subsistence in the hollows of the water-courses. Near Ras Nus is a ravine, with some date trees, through which runs a stream after heavy rains.

Weather.—During the prevalence of the strong northerly winds named Belats, which are experienced in Khorya Morya bay, and westward of Merbat, a strong south-easterly wind will be found, blowing over Merbat during the day, and light variable airs during the night, *see* page 13. Rain seldom falls at Merbat, but, to the westward, the mountains and plain of Dhofar experience a great deal of rain at times during the South-west monsoon.

KHORYA MORYA BAY is the deep bight in the coast between Ras Nus and Ras Sharbitat, which capes bear from each other N.E. by E. and S.W. by W., and are 70 miles apart. Four of the five Khorya Morya islands are outside of this line, Haski, the western island, being within it; the four largest, including Haski, lie in a line East and West of each other, and are close to the edge of the bank of soundings.

See chart, No. 10*b*, and plan, No. 11.

Within the line of the islands, the depths in the bay are fairly regular, varying between 20 and 45 fathoms, and decreasing both towards the shore and the islands; the bottom is generally sand, coral, and shells, but is occasionally rocky near the islands and also near Ras Sharbitat. On the western side of the bay, until within Ras Hasik, the water is very deep, there being no bottom at 100 fathoms close to the shore, and half way between Ras Nus and Haski island a depth of 1,250 fathoms has been obtained.

The shore of the bay is a succession of limestone cliffs and sandy beaches, *see* views on chart. There are no villages, the few inhabitants living in excavations or caves in the rocks and subsisting almost entirely on fish.

RAS NUS is the low but prominent rocky cape, forming the south-western extreme of Khorya Morva bay, and the south-eastern point of the small boat anchorage presently described, and named after it. The cape may be easily known by Jebel Nus, the eastern termination of the Jebel Samhan range, 1,200 feet in height and immediately over it; Jebel Nus is shaped like a gunner's quoin, with the highest and most precipitous part nearest the sea, something like a bluff. Immediately south-westward of Ras Nus is a large mass of rock near the shore, shaped like a tub.

Bander Nus is the small boat anchorage already mentioned between Ras Nus and Ras Samhar, affording shelter from southerly and westerly winds. The anchorage is close to the shore, there being 9 fathoms water at about $2\frac{1}{2}$ cables off.

Ras Samhar is the low rocky northern point of Bander Nus, with a reef off it and two small rocks a few yards distant. In a small valley between Ras Samhar and Ras Hullan, $2\frac{1}{2}$ miles farther northward, and about one mile from the sea, is the tomb of Nebi Saleh-bin-Hud; it was once an edifice of some strength and splendour, being 50 feet long and nearly the same breadth. The whole is now a mere heap of ruins.

Water.—Firewood.—Close to the anchorage in Bander Nus is a spring of good water, sufficiently abundant to supply two or three vessels in one day; its position may be known by a grove of date trees near it. Also in Wadi Samha, a small and wooded valley to the northward between Ras Hullan and Ras Samha, is a spring of fresh and a pool of brackish water, near the sea; firewood may be cut from the ravines in the neighbourhood.

RAS HASIK, a low projecting rocky point $8\frac{1}{2}$ miles northward of Ras Nus, is the southern point of Ghubbet al Dom.

The coast here presents a very striking scene; the unbroken face of the limestone mountains with the sharp peaks of the granite ranges (one of which, Jebel Habrut, attains the height of 4,000 feet) are very grand;

yet it has a most barren appearance from the sea, not a particle of vegetation being perceptible to the eye. On shore, however, the valleys are found to be well wooded, having generally either wells or a rivulet of fresh water; *see* view on chart.

Bander Hasik is a small bay on the north-western side of Ras Hasik, affording shelter from southerly winds. The soundings do not extend any great distance off-shore, there being no bottom at 130 fathoms $2\frac{1}{2}$ cables from the point. Close to the shore the depths are from 5 to 12 fathoms.

In a valley at a short distance from the head of the bay are the ruins of the ancient town of Hasik, and a well of brackish water. The natives here are wretched in the extreme, living almost entirely on fish, and many of them being without clothing. Immediately southward of Ras Hasik is a plain called Suk Hasik, from its having been the market-place when Hasik flourished, off which there is shelter for two or three boats from northerly winds.

An inlet of the sea (the bed of which is now a marsh, separated from the sea by a ridge of sand) once existed in the valley of Hasik, and in all probability formed the ancient port, as its waters would almost wash the base of the old ruined town. A few stunted date trees are scattered over its surface, and the bed of the valley higher up is densely filled with acacias, tamarisks, and other small trees. The slopes of the mountains produce frankincense, which is collected in small quantities in the proper season by the Bedouins.

Soundings.—Between Merbat and Ras Hasik, the 100-fathoms contour-line of soundings approaches in some places to within half a mile of the shore, and in others to 2 and $2\frac{1}{2}$ miles. Sailing vessels, therefore, should keep a good offing, as, in the event of being becalmed, there is no anchorage.

Ghubbet al Dom, on the western side of Khorya Morya bay, lies between Ras Hasik and Ras Muntajib, which are about 17 miles apart. The coast between Ras Hasik and Ras Tihrrar, a low sandy point, is irregular; from thence round the bay (with the exception of a sandy spot just northward of Ras Attabarran and 7 miles northward of Ras Tihrrar, fronting a valley, where there is a pool of fresh water), it is high precipitous table land, with three conspicuous valleys. The depths in this bay are regular; the 10-fathoms contour-line being nearly one mile, and the 20-fathoms line 3 miles off-shore.

Wadi Reikut, fronted by a sandy cove, is said to extend to the confines of Hadramaut, having the peak of Habrut and the Samhan range of mountains as its southern boundary. It appears to be thickly wooded and well watered; the breadth of the watercourse, and the huge masses of

rock that have been swept down it, fully denote a strong torrent after a heavy fall of rain. At the entrance to the valley are a spring of fresh and a lake of brackish water.

Ras Muntajib is a bluff headland, with a rugged peak close northward of it.

THE COAST from Ras Muntajib takes a N.N.E. direction for 7 miles, and then E. by N. $\frac{1}{2}$ N. 16 miles to the high and dark point of Shuwamiya. At the end of the first 7 miles, the steep cliffs terminate and the high land recedes from the shore 2 or 3 miles, and, after continuing in a line parallel with the beach, again reaches the sea at the dark point of Shuwamiya above mentioned, and which must not be confused with Ras Shuwamiya a few miles farther eastward. The shore and plain fronting the mountains are low and sandy, with some bushes; there is a sand-hill at the western extreme of the plain, and a clump of trees at the eastern extreme.

From the dark point of Shuwamiya, the coast again assumes a bold character, consisting of steep cliffs and a table-land from 400 to 600 feet in height, which runs in an unbroken line for 25 miles, or to within 11 miles of Ras Sharbitat; the coast from the high dark point mentioned trending in a general E. $\frac{1}{4}$ N. direction for 36 miles to Ras Sharbitat.

Ras Shuwamiya is a point 10 miles eastward of the dark point of Shuwamiya. The coast is bold, having 12 and 15 fathoms water within $2\frac{1}{2}$ cables of the shore.

Ras Minji, a slightly projecting bluff nearly 700 feet high, is $10\frac{1}{2}$ miles eastward of Ras Shuwamiya, with a pool of fresh water near the sea close eastward of it. This point is the boundary between the Garra and Jeneba tribes.

The soundings between Ras Shuwamiya and Ras Minji are from 30 to 33 fathoms at half a mile off-shore, with overfalls.

The cliffs about 2 miles eastward of Ras Minji are 700 feet high, from thence decreasing eastward, where they terminate one mile inland. Between this point and Ras Karwao the shore is low and sandy for 7 miles, resuming its cliffy character about 2 miles westward of that point.

Ras Karwao is a bluff table-topped headland, about 800 feet in height, with steep precipitous sides. Its component parts are a species of sandstone, lying over a horizontal stratum of chalk from 25 to 30 feet in thickness, with masses of flint and fossil remains embedded in it, while the sandstone varies in thickness from 5 to 10 feet. In some places, between the two strata are enclosed beds of shells, coral, and other marine productions. The summit appears to be of tertiary limestone, with fossil remains.

There is a sand-hill westward of Ras Karwao, and the cliffs here are fronted by a piece of low land with off-lying rocks. At the western extreme of the low land there is a small salt-water lake, at the head of which the water is fresh.

RAS SHARBITAT, in lat. $17^{\circ} 53' N.$, long. $56^{\circ} 20' E.$ and 2 miles eastward of Ras Karwao, is the eastern point of Khorya Morya bay, and is a precipitous bluff with an even table surface and a deep notch or concavity in the face of it; *see* view on chart.

Anchorage.—Native boats, running down the coast, frequently anchor for shelter from the Belat or northerly winds, off the low sandy shore westward of Ras Karwao, known as Bander Sharbitat. There is good anchoring ground all along here, in from 5 to 10 fathoms water; but towards Ras Minji, the bank suddenly deepens from 7 to 30 fathoms. The bottom is sand in the anchorage depths, but outside it becomes mixed with rock.

During the Belats, which blow with great violence in this bay, a sailing vessel coming from the eastward should round Ras Karwao very closely and be prepared for strong gusts, both in rounding and making towards the anchorage off the small salt-water lake described. A large mangrove tree near the lake is a conspicuous mark for its position.

KHORYA MORYA ISLANDS.—These islands are five in number, namely, Haski, Soda, Hallaniya, Kabliya, and Kirzwet. The first four, as has been stated, are close to the edge of the bank of soundings, and lie in a line nearly East and West and parallel with the northern shore of the bay, from which they are distant about 22 miles. They are generally bold and rocky, rising in regular conical peaks. They belong to the British Government, having been ceded by the Imaum of Maskat for the purpose of temporarily landing the Red sea and Indian telegraph cable of which Hallaniya was the signalling station.

Haski, the westernmost island of the group, bears E. by N. $\frac{1}{4}$ N. 15 miles from Ras Hasik, and is $1\frac{1}{4}$ miles in length N.N.E. and S.S.W., by three quarters of a mile in breadth; its southern end rises in two conical peaks close together, attaining a height of 500 feet; *see* view on chart. It is of granite, without a vestige of vegetation, or any appearance of ever having been inhabited. The surface is quite white from guano deposit.

The island is rocky all round, with two small bays on its eastern side. Half a mile S.W. by W. $\frac{1}{4}$ W. from the north-western point is a shoal about a quarter of a mile in extent, on it is a rock 150 yards long and dry at low water; between it and the island there is a depth of 16 fathoms. There is no other danger.

The average depths at one mile round the island are from 25 to 30 fathoms. The edge of the bank of soundings passes near the southern point, there being no bottom at 145 fathoms half a mile off. The channel between Haski and Soda is safe, with the exception of the sunken rock off the western side of Soda.

Soda is the second island of the group from the westward and the second largest in size, being 3 miles long East and West by $1\frac{1}{2}$ miles wide, and lies about $12\frac{1}{2}$ miles eastward of Haski. Its shores have many small projecting points off which reefs extend from half to $1\frac{1}{2}$ cables, forming coves fit for small craft. The eastern end is entirely fronted by rocks.

The outline of the island is an irregular slope from the highest peak, which is near the centre and 1,310 feet above the sea level; *see* view on chart. The whole island is extremely barren, having no trees but tamarisks, and only a small quantity of grass and moss near the summit of the peak. It was inhabited many years since, and the remains of rude dwellings are still visible near a well close to the south-eastern point, the water of which is brackish.

Rock.—About 7 cables West from the western point of the island is a sunken rock surrounded by a bank upwards of half a mile in extent, with 2 and 3 fathoms water, between which and the shore is a narrow channel having from 5 to 6 fathoms.

Anchorage.—On the southern side of the island there is a bay, half a mile wide at its entrance and receding about three-quarters of a mile, with good anchorage, having 10 fathoms water in the centre, the depth decreasing as the shore is approached. A ledge of rocks extends from $2\frac{1}{2}$ to 3 cables from the eastern point of the bay in a south-westerly direction, and there is a sunken rock at a short distance from the western point. This bay affords shelter from all winds, except those from W.S.W. to South.

Depths.—The soundings round Soda are deep, there being from 20 to 30 fathoms close in between the eastern and northern points; 20 to 30 fathoms at one mile off from the northern to the western point; 40 fathoms at one mile off the south-western side; and, the edge of the bank passes only 7 or 8 cables from the southern side, there being 130 fathoms at that distance. The bottom is sand and rocks on the eastern and western sides of the island; sand, shells, and coral on its northern side; and grey sand on its north-western side.

If passing between Hallaniya and Soda, keep near the Soda side, which may be safely approached to within half a mile, to avoid the rocks lying off the western end of Hallaniya, which reduce the width of the channel to $2\frac{1}{2}$ miles. There are depths of from $6\frac{1}{2}$ to 12 and 20 fathoms in mid-channel.

Hallaniya, the largest island of the group, is $7\frac{1}{2}$ miles long East and West by $4\frac{1}{2}$ miles wide, and lies $4\frac{1}{2}$ miles eastward of Soda. The general appearance of the island is rugged, the centre being filled with numerous granite peaks, of which the highest is 1,503 feet above the sea, forming chimney peaks closely united, and terminating at the eastern and western ends of the island in comparatively low points. The mountains end at the northern point of the island in a bold, projecting, limestone bluff, 1,645 feet in height, the loftiest part of the island, and presenting a rugged and nearly perpendicular cliff to the sea for upwards of a mile on each side of the point; see view on chart. The whole island is extremely barren, the largest and only tree being the tamarisk; there is a little grass on the eastern side.

It is the only island of the group that is inhabited, and that but by a few people who live in huts on the north-western side, about one third of a mile from the beach. They are almost entirely dependent for subsistence on the fish they catch. A few boats occasionally touch here on passing, and exchange small and useful articles for dried fish.

Reefs.—There are several shoals and isolated rocks off the western end of Hallaniya, between which are narrow channels of from 5 to 10 fathoms. One of these rocks, three quarters of a mile from the point, dries at low water, springs; the westernmost patch is $1\frac{1}{2}$ miles from the point. Off Ras Saur, the eastern point of the island, and for $2\frac{1}{2}$ miles south-westward of it, the coast is fronted by a reef of rocks extending in some places from 5 to 8 cables from the shore. About 4 cables S. by E. from the southern point of the island is a small bank having $3\frac{1}{2}$ fathoms water, and in the bay westward of the point is a reef of rocks close to the shore.

Anchorage.—The best anchorage at Hallaniya is in from 8 to 12 fathoms, sand, on the northern side, at about one mile from the western extreme, and a quarter of a mile off a small sandy nook, but it is open to all winds from East through north to West. Vessels anchoring here in the North-east monsoon must, therefore, be prepared to start at a moment's warning, the Belats, or northerly winds, setting in very suddenly, when the coast of the island becomes a dead lee shore.

There is also good anchorage farther to the north-west, in Ghubbet Ar-rahib on the north-eastern side of the island, in from 7 to 14 fathoms water, with shelter from all winds from S.E. through south to N.W. During the strength of the South-west monsoon, heavy south-westerly squalls come down the gully between the Lills, and a considerable sea gets into this bay, at which time the western anchorage is preferable.*

* Remark Books, Navigating Lieut. F. Roberts, H.M.S. *Rifleman*, 1875, and Lieut. John D. Daintree, H.M.S. *Griffon*, 1890; the latter vessel parted her cable in a squall at this anchorage when lying in only 6 fathoms water.

See plan, No. 11.

Water.—Fresh water may be obtained in Ghubbet Ar-rahīb from a well 400 yards from a nook with a sandy beach, which may be known by a small peak that forms its eastern end; its position may be seen on the chart. There are two other wells towards the western end of the island, one near the western anchorage on the northern shore, the other on the southern side.

Kabliya, the eastern island and the third largest of the group, is nearly 2 miles long by one mile wide, and shows from every point of view several limestone peaks, of which the highest is 550 feet above the sea; see views on chart. It is barren and rocky all round, with the exception of a small sandy bay at the north-western point.

The channel between Hallaniya and Kabliya is nearly $12\frac{1}{2}$ miles wide, with from 20 to 46 fathoms water, and is free from danger.

Four-peaked rock, so named from its outline, lies two thirds of a mile W.N.W. from the northern point of Kabliya, with a rocky channel between them of from 2 to 3 fathoms. It is about 100 feet above the sea, and has a rocky ledge extending half a mile north-westward from it on which are four rocks above water; parts of the reef dry at low water, springs.

Well rock is so called from its having a natural well filled with salt water, which is probably thrown up during the South-west monsoon. It lies 4 cables off the south-western point of Kabliya, with depths of from 7 to 10 fathoms between.

Tilly rock, with 3 fathoms water, lies E. by S. $\frac{1}{4}$ S. rather more than one mile from the eastern extreme of Kabliya.

There is a small and dangerous rock, awash at low water, and which usually breaks, $2\frac{1}{4}$ miles eastward of Tilly rock, with the eastern point of Kabliya bearing W. $\frac{7}{8}$ N. $3\frac{1}{2}$ miles. Four-peaked rock well open northward of the island leads northward of it. Vessels should be careful in rounding the eastern end of the island at night, as these rocks are steep-to and the depths around are irregular.

Anchorage.—There is indifferent holding ground requiring a long scope of cable on the northern side of Kabliya, the bottom being loose and decayed coral; on the southern side there is also anchorage in about 12 fathoms, similar bottom, with Well rock bearing W.S.W. and the western extreme of the island W.N.W. There is no water on the island.

Kirzwet, or Rodondo, is a mere rock with a double peak, of which the highest is 230 feet above the sea; the base of the island consists of four red granite rocks closely grouped together. It lies 6 miles north-eastward of Hallaniya, and there are from 25 to 30 fathoms between the two islands.

A sunken rock lies about $1\frac{1}{2}$ cables north-westward of Kirzwet, and another near it, but only three-quarters of a cable from the island, with depths between them of from 8 to 16 fathoms. Close off the eastern point of the island are two rocks above water; on all other bearings there are 20 fathoms water within a quarter of a mile of the island.

Tides.—It is high water, full and change, in Khorya Morya bay and amongst the islands at 8h. 20m.; springs rise $6\frac{1}{2}$ feet. Southward of the islands the flood tide sets eastward; northward of the islands it sets westward.

Current.—Between Ras Farták and Ras Nus, the current often runs against the wind during the North-east monsoon. Amongst the Khorya Morya islands it varies very much, and frequently sets north-westward, rendering it unsafe for a sailing vessel to get becalmed near the islands; it is advisable, therefore, for such vessels to pass well southward of them, unless at a time when land and sea breezes prevail, when they may make progress against the monsoon by keeping close in-shore.

See plan, No. 11.

CHAPTER XII.

RAS SHARBITAT TO RAS AL-HADD.

(Lat. $17^{\circ} 53'$ N. to lat. $22^{\circ} 32'$ N.)

VARIATION IN 1900.

Ras Madraka $0^{\circ} 20'$ W.		Ras Al-Hadd $0^{\circ} 10'$ E.
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The Coast from Ras Sharbitat trends north-eastward for 21 miles to Ras Sukra, presenting a noble limestone cliff about 600 feet in height, precipitous to the water's edge, and with level table land at its summit. The shore is quite bold, there being 20 fathoms water close to the cliff. The soundings along this part of the coast are regular. At from 21 to 29 miles E. by S. from Ras Sukra, is a coral bank of from 21 to 29 fathoms. The 100-fathoms contour-line of soundings is about 37 miles off Ras Sukra, and 7 or 8 miles outside this coral bank.

Ras Sukra is a prominent bluff cape rising 600 feet above the sea, and is the south-western extreme of Sukra bay. From the north-eastward, it appears a perfect bluff; about 24 miles northward of it is Funnel or Tower hill, which, when first sighted, appears separated, but on a nearer approach is found to be on the summit of the adjacent high table-land, which, from Ras Sukra, gradually recedes from the shore. When the sun shines on it, the whole line of coast has the appearance of clay cliffs. From Funnel hill, the table-land takes a more easterly direction, and gradually approaches the shore again towards the eastern extreme of the bay.

SUKRA BAY.—The coast from Ras Sukra trends northward for about 35 miles, and then gradually curves away eastward nearly 60 miles to Ras Khishayim, forming between the two points, which bear from each other N.E. $\frac{3}{4}$ E. and S.W. $\frac{3}{4}$ W. 80 miles, the deep bay of Sukra. The shore is low and sandy throughout, and thinly sprinkled with mangrove bushes, but from 5 to 10 miles inland is a range of moderately high table-hills. During the North-east monsoon, there is always a heavy swell rolling into the bay and a high surf on the beach.

There are no villages in the bay, and it is but scantily inhabited by a few miserable fishermen of the Jeneba tribe, who have no boats, but fish sitting

See charts, Nos. 10b and 10c.

on inflated skins which they manage with great dexterity, pushing themselves safely through the high surf; see also page 470. They catch great numbers of sharks, which, strange, to say, never attack their exposed limbs. The fins and tails of the sharks are dried and exported to Maskat by passing vessels.

The depths in Sukra bay are from 6 to 12 fathoms near its south-western extreme, but deeper and more regular at its north-eastern end. For a distance of 45 miles northward from Ras Sukra, the bay is shallow (generally under 5 fathoms) from 5 to 7 miles from the shore, and over this portion there is usually a strong ripple, from whence it has derived the name of *Rig-al-Jazir*; but there appears to be no danger except close in eastward of Funnel hill, where a rocky bank, nearly dry at low water, extends 2 miles or more from the beach. Towards the eastern extreme of the bay, the shore is safe to approach, the 10-fathoms contour-line being about 2 miles off.

Ras Khishayim is a dark slightly projecting perpendicular bluff terminating a range of flat-topped hills at the north-eastern extreme of Sukra bay and about 8 miles westward from Ras Madraka.

Takiyat Abak (Abak's cap), so named from its supposed resemblance to a man's head-dress, is a bluff point 333 feet above the sea, about 4 miles south-westward of Ras Madraka.

Bander Jezirat is a small bay with a sandy beach between Ras Madraka and the cliffs of Ras Khishayim. In this bay, the bottom is of mud and sand, and a vessel may anchor in any part of it. Should the wind shift to the south-westward and blow hard, which is not at all unfrequent during the North-east monsoon, a vessel should shift her anchorage to the northern side of Ras Madraka. Trading craft from the northward often anchor here for the purpose of procuring sharks' fins.

RAS MADRAKA is a dark point, with a rocky islet about half a mile in length and 60 feet high lying off it, with a depth of 2 feet, at low water, in the channel between. It is the south-western point of the gulf of Masira; the land about it is composed of black volcanic peaks, with flat-topped hills in the background, of an average height of 450 feet. Copper ore of a poor quality is found in the vicinity.

When approached from seaward, the point appears like an island, hence it is sometimes called Ras al Jezirat or Isolette. On being first seen, it presents the appearance of small detached hillocks, but, on a nearer approach, the peaks become connected, and a small and remarkable circular hill is observed on the summit of the point.

The point is bold, there being 12 fathoms water within half a mile of the shore; the 100-fathoms contour-line of soundings is distant about 10 miles from it.

See chart, No. 10c, with plan of Madraka.

Anchorage.—A good position in the South-west monsoon, northward of Ras Madraka, is, with the eastern extreme of the islet bearing South about 7 cables, Table hill S.W. $\frac{3}{4}$ W., and Black rock point W. by N.; small vessels might anchor closer in, but a long swell sets in here. This is a good place from which to await the slave dhows, which leave the Zanzibar coast bound to the Persian gulf early in the South-west monsoon. No supplies are obtainable from the natives, who avoid intercourse with Europeans, but an abundance of fish may be taken in the seine.

GULF OF MASIRA.—The gulf of Masira is the extensive bight lying between Ras Madraka and Masira island. The whole coast of the gulf is desolate, and but thinly inhabited by small parties of the Jeneba tribe, who subsist almost entirely on fish.

Shoals in the Approach.—**Shab Kudún, or San Carlos banks,** are several coral patches off the coast between Ras Markaz and Ras Kuweirát, and extend about 20 miles in a N.E. and S.W. direction. The south-western patch is 4 miles in length; its western extreme lies with Ras al Aani bearing W. by N. $\frac{1}{4}$ N. 5 miles. From the central bank, on which the *San Carlos* struck, Ras Kuweirát bears N.W. and Ras Madraka table-hill S. by W. $\frac{1}{4}$ W.; both are visible from a vessel's deck.

The soundings on the banks are from 4 to 9 fathoms, coral bottom; considerable swell rolls over the shallow parts, and in a heavy sea would probably break. Between the banks the depths are from 12 to 14 fathoms, sand and shells, and between the south-western extreme and the land, from 16 to 19 fathoms, sand and shells.

These banks should not be approached from the seaward side to a less depth than 20 fathoms; the safer depth near the central bank is 22 fathoms.

Shab Bu-Saifa is a coral bank nearly 12 miles in length with an average breadth of 5 miles, and tapering to the southward. It has from 6 to 10 fathoms water over it, from 16 to 20 fathoms on its eastern edge, and from 15 to 17 fathoms on its western edge.

From the southern point of the bank, Jezirat Hamar-an-Nafur bears W. $\frac{1}{4}$ S. about 23 miles, and is visible from the masthead. For reefs within these, see page 459 and the chart.

Between Shab Bu-Saifa and Shab Kudún, the depths are from 14 to 17 fathoms, sand and shells, and between Shab Bu-Saifa and Jezirat Hamar-an-Nafur, they vary from 12 to 20 fathoms, nearly all mud.

Caution.—A near approach to the gulf should be avoided by vessels passing up or down the coast, owing to the numerous dangerous coral patches and banks which exist within its limits; and also on account of the indraught, which at times exists near and within the shoals, especially on the flood, which runs from N.N.W. to N.W. at $1\frac{1}{2}$ miles an hour; the

See chart, No. 10c, with plan of Madraka.

ebb running at the same rate in the opposite direction. Beyond the limits of the bank of soundings, the tidal set is parallel with the shore, but is probably lost in the prevailing current. As there is ample room for soundings being taken between the outer reefs and the edge of the bank of soundings, a distance of from 10 to 15 miles, common attention to the lead should prevent any vessel running into danger. During strong winds there is always a heavy swell rolling in, and on many parts of the numerous banks the sea breaks heavily.

Tides.—It is high water, full and change, at the outer shoals, at 9h. 30m.; springs rise 10 feet; the set is as before mentioned, when not affected by current.

The Coast.—From Ras Madraka, the shore of the gulf of Masira trends northward for 10 miles to Ras Markaz; it is sandy, with hills immediately behind, until within 2 miles of the latter point, when it assumes a bold precipitous character. From Ras Madraka, for a distance of $3\frac{1}{2}$ miles, it is fronted by a narrow sand-bank which dries at low water. Immediately inland, there is flat table-land from 460 to 480 feet above the level of the sea.

Ras Al-Dthila, a small projecting rocky point 5 miles northward of Ras Madraka, is the commencement of an uniform line of table-land extending as far north as Ras Kuweirát, descending to the sea in perpendicular cliffs, and varying in height from 230 to 480 feet. The land at Ras Al-Dthila is 470 feet above the sea.

Water.—Fresh water may be procured in small quantities at this point, and the fishermen will take it to a vessel at a reasonable price.

Ras Markaz is a bold, projecting, bluff point, and the highest part of the table-land, it being 480 feet above the sea. There are 6 fathoms water within $1\frac{1}{2}$ cables of the point.

The bank of soundings extends 10 miles off Ras Madraka, increasing to 20 miles eastward of Ras Markaz, and it is perfectly free from dangers until the San Carlos bank is approached. The bottom is chiefly sand and shells.

Ras Khaisat al Liyokh.—From Ras Markaz the shore curves to the north-westward for about 4 miles to Ras Khaisat al Liyokh—a bluff difficult to make out unless close in-shore—forming a small bay with a sandy beach, from which the lofty cliffs recede nearly three quarters of a mile.

Anchorage.—The bay affords good shelter from southerly and south-westerly winds, with safe anchorage in from 6 to 7 fathoms, sand.

From Ras Khaisat al Liyokh to Ras al Aani, a distance of 14 miles in a northerly direction, the coast presents an uninterrupted line of bold

perpendicular cliffs and is safe to approach, there being from 3 to 4 fathoms close in, and 10 fathoms within half a mile.

Ras al Aani is a bluff point 280 feet above the sea, from which the coast runs north-north-westward 5 miles to Ras Mattah, a bluff projecting point 230 feet high. From Ras Mattah, the coast trends northward $9\frac{1}{2}$ miles to Ras Kuweirát; for the first 5 miles the cliffs are fronted by a sandy beach.

Ras Kuweirát, a sharp projecting bluff with a small peak 250 feet high on its extreme, is the termination of the bold perpendicular cliffs just described.

Ghubbet Kuweirát is the bay between Ras Kuweirát and Ras Sireir, a low rocky point with two small rocky islets close off it; the shore of the bay is a sandy desolate plain, thinly covered with mangrove bushes. It is free from danger, having depths of from 3 to 6 fathoms, sand and coral, at $1\frac{1}{2}$ to 3 miles from the beach respectively.

Boat anchorage.—Close under Ras Kuweirát there is a sheltered anchorage from south-westerly winds, available for boats only, the water being shallow.

Jezirat Hamar-an-Nafur is a perpendicular limestone islet, a quarter of a mile in diameter, 320 feet high, and about 3 miles eastward of Sireir. The summit is flat and split in all directions. Myriads of wild fowl frequent it, and there is an accumulation of guano which is occasionally taken away by the Arabs for agricultural purposes. Close to, both on the eastern and western sides, are some sunken rocks.

The channel between the island and the mainland is free from danger, with depths of from 3 to 6 fathoms, clay. About 2 miles seaward of the island, the depths are 8 and 9 fathoms.

Ras Sidarra is a low, ill-defined, sandy point, $4\frac{1}{2}$ miles northward of Sireir, the coast between being alternately sand and cliff. On the point is a small village and a date grove, and immediately inland are several groups of conical hills.

The soundings off this part of the coast are regular, with muddy bottom.

Ras Nakhreir.—From Ras Sidarra, the coast continues in a northerly direction for about 5 miles to Ras Nakhreir, a bold, bluff point, 465 feet above the sea; for 2 miles southward of it the coast is of the same bold nature, being a perpendicular cliff down to the water's edge.

From the point, the coast trends North 12 miles to Ras Saráb, the beach being sandy the whole way, with a range of hills from 700 to 800 feet high rising abruptly above it. At $3\frac{1}{4}$ miles from Ras Nakhreir is Ras Eikeit, a low sandy point.

See chart, No. 10c.

From Ras Sidarra to Ras Saráb the shore is safe to approach, there being from 4 to 5 fathoms one mile from the beach. Beyond this distance is an extensive flat of from 6 to 15 and 20 fathoms water, with a muddy bottom towards the shore, and sand and shells, with patches of coral, farther out.

Ras Saráb is a low, sandy, ill-defined point, near which is a small village. Fresh water is procurable at this point, the fishermen being willing to carry it off to a vessel at a reasonable charge.

From Ras Saráb the coast trends north-eastward 13 miles to Ras Bintot; the shore is low, sandy, and forms the bay called Ghubbet Saráb.

REEFS.—**Shab Ghubab** is a breaking patch half a mile in length, with depths of from 3 to 7 fathoms close around. It lies 7 miles from the shore of Ghubbet Saráb, with Ras Bintot bearing N. $\frac{1}{4}$ E. 8 miles, and Jebel Shabatein N.W. $\frac{3}{4}$ W.

At 4 miles westward of Shab Ghubab is a rocky bank with from 2 $\frac{1}{2}$ to 3 fathoms water. S.S.W. $\frac{1}{2}$ W. 2 miles from Shab Ghubab is a bank with 5 $\frac{1}{2}$ fathoms water. At 6 miles S. by W. is the northern extreme of a reef 4 miles in length; and midway between Ghubab and Shab Bu-Saifa is a reef about 3 $\frac{1}{2}$ miles in length.

From the western side of Shab Bu-Saifa, northward to Kinaset Hikman, and to Masira island, the general depths are from 7 to 10 fathoms, sand and coral, with occasional overfalls. From the same side of the shoal westward, the depths are from 13 to 17 fathoms, mud, decreasing to 9 fathoms off Ras Bintot. There are a few detached patches of coral, with from 7 to 10 fathoms, but no known dangers except those just described.

The Coast.—**Jebel Shabatein**, a conspicuous peaked hill 483 feet high, lies 8 miles westward of Ras Bintot, and is an excellent mark for avoiding the dangerous breakers of Shab Ghubab.

Ras Bintot is a low, wide, sandy point, forming the north-eastern extreme of Ghubbet Saráb, and the south-western extreme of Ghubbet Bintot. From the southern point of this cape, a rocky spit with 3 fathoms extends S. by W. 4 miles, with depths of from 6 to 7 fathoms, mud, close to it.

Ghubbet Bintot lies between Ras Abana and Ras Bintot; the shore is sandy and backed by a range of hills rising from Ras Abana, which turn away westward on the northern side of Jebel Shabatein. The bay is free from danger, the depths varying from 3 to 6 fathoms, mud bottom.

Ras Abana is a low rocky point, with the low range of hills before mentioned rising from it; it is the western point of entrance to Ghubbet Hashish.

Water.—Fresh water may be procured at this point in small quantities, the natives supplying it at a reasonable charge.

Shab Iziyat, a patch of rocks covered at high water, lies with Ras Abana bearing N.W. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles, with a clear channel between of from 5 to 7 fathoms, rocky ground, the deepest water being close to the shoal.

There is a small rocky 3-fathoms bank S.W. by W. nearly 2 miles from Shab Iziyat.

GHUBBET HASHISH, at the head of the gulf of Masira, is a bay 7 miles wide between Ras Abana and Ras Shijarét, which points bear from each other about W. by N. and E. by S., the bay receding 9 miles northward of this line, with depths of from 4 to 7 fathoms in the entrance. In approaching the bay, care must be taken to avoid the foul ground extending 7 or 8 miles southward of Bar-al-Hikman peninsula.

The shore of the bay is low, sandy, and desolate throughout. On the western side is a low range of hills inland. Close to the shore, at $1\frac{1}{4}$ miles N. by W. from Ras Abana, is a pyramidal hill 120 feet in height.

Near the centre of the bay is Jezirat Ab, a low rocky islet with a small rock off its southern end, from which a mud bank extends 3 miles in a northerly direction, dividing the bay into two parts, then spreading out on either side eastward and westward, and extending from the northern shore of the bay a distance of 3 miles. This mud bank dries at low water, rendering the shore inaccessible before half flood.

Anchorage.—The portion of the bay eastward of Jezirat Ab is 2 miles in width, with from $1\frac{1}{2}$ to 3 fathoms, sand. That part of the bay westward of the island is 5 miles wide, with from 3 to 6 fathoms, mud. A little westward of a line drawn between Ab and Rig islands, and nearly equidistant from both, there is a patch of sunken rocks.

Village.—On the mud bank near the head of the bay are two islands; one, named Rig, is rocky and steep: the other, named Mahut, is low, sandy, thickly covered with shrubs and mangrove bushes, and has on it a village belonging to the Jeneba tribe.

On the north-eastern side of the bay is the entrance to a creek reported by the natives to communicate with the Masira channel; but more probably with Khor Milh, a salt-water lagoon close to the beach, eastward of Ras Zeiwari.

Supplies.—Very good sheep, firewood, and fresh water may be procured at the village on Mahut island.

Fogs.—Thick fogs are prevalent in the vicinity of Ghubbet Hashish and the gulf of Masira during the North-east monsoon, which are borne down with rapidity by a sudden impulse of wind from the northward.

Tides.—It is high water, full and change, at Jezirat Ab, at 10 h.; springs rise 10 feet. The flood sets N.N.W. into the bay. The ebb runs S.S.E. at about three quarters of a mile an hour.

BAR-AL-HIKMAN PENINSULA, which divides the Masira channel from Ghubbet Hashish, is very low, sandy, and covered with bushes for many miles.

Ras Shijarét, off which is a small rocky islet, is the low sandy western point of the Bar-al-Hickman peninsula, and is the eastern point of entrance to Ghubbet Hashish, as already described.

From Ras Shijarét the coast trends south-eastward $5\frac{1}{2}$ miles to Ras Zeiwari, and from thence eastward 10 miles to Ras Mishsiyu. It is low, sandy, and desolate for the whole distance, and fronted by a coral bank which dries at low water and extends from half a mile to $1\frac{1}{2}$ miles from the shore, with overfalls of from one to 3 fathoms extending 3 miles off-shore.

Kinasat Hikman is the extensive reef which begins at Ras Shijarét, from thence stretching away to 6 or 7 miles south-westward and southward of Ras Zeiwari, with foul ground of 5 fathoms and less, and extending for 7 miles off-shore as far as Ras Mishsiyu. It consists of dangerous coral patches, of which some are dry at low water; the low land of Bar-al-Hikman is only just visible from the extreme edge of this foul ground.

Ras Zeiwari, the south-western point of the Bar-al-Hikman peninsula, is a low sandy point. Immediately inshore to the eastward, and separated from the sea by a narrow ridge of sand, is Khor Milh, a large salt-water lagoon.

About halfway between Ras Shijarét and Ras Zeiwari is Ras al Hassi, another low round sandy point.

Ras Mishsiyu is the low sandy south-eastern point of Bar-al-Hikman peninsula and forms the western boundary of the southern entrance to the Masira channel.

MASIRA ISLAND is about 36 miles long N.N.E. and S.S.W. by 10 miles in breadth, and has an area of nearly 200 square miles. It is from 8 to 12 miles distant from the mainland, between which and it are several islets, shallow banks, and rocky patches, leaving only narrow navigable channels.

The island is generally of a hilly aspect, but low in the centre and at the northern extreme; *see* view on chart. The hills form clusters of small peaks, the greatest height being 620 feet, and the average about 400 feet. Approaching the island from the northward or north-eastward, the most conspicuous hill is Jebel Mathrub, a rounded hill on the northern range 620 feet high and standing amid a cluster of lesser hills, one of which

about $1\frac{1}{4}$ miles north-eastward of Jebel Mathrub, is named Sharp peak from its peculiar form. Nearly all the hills are of volcanic formation, except some table-land in the vicinity of Ras Yei, the eastern extreme of the island.

The depths on the eastern side of the island are irregular as regards distance from the shore, but increase gradually to seaward. There are several shallow patches at some distance from the shore, as hereafter described.

Population.—Produce.—The population of Masira island is scanty, amounting probably to less than 1,000 souls, mostly of the Jeneba tribe, all miserably poor, subsisting chiefly on fish, and said to be not over friendly to Europeans; they have no cattle, but possess a few dhows and many fishing boats. Fish of very excellent quality are plentiful all round the island. Sharks abound, and are caught for their fins and tails, which are dried and exported to Maskat for the Chinese markets.

Turtles are very numerous between Masira and the mainland, but more particularly in the neighbourhood of Ghubbet Hashish. There are two kinds, the edible, probably the *Chelone mydas*, and the inedible *C. imbricata*, or hawk's-bill turtle, both common to the Indian Ocean. They grow to much about the same size, one of the former weighed 266 lbs. The latter, or inedible turtle as it is termed from its being so much less fleshy and fat, yields the turtle shell of commerce. The inedible turtle is much scarcer than the edible one. The carapaces of both species are used by the Arab fishermen for fireplaces in their boats.

Ambergris is sometimes found at Masira, as well as on the opposite coast. The sperm whale is common, also several other species of cetacea, and myriads of cuttle-fish and cephalopods of all kinds, on which the whale feeds.

The island itself is barren and sterile, producing no vegetation beyond two or three date groves and a few pumpkins. The animals found are a few gazelles, hyænas, jackals, and wild asses.

Copper ore of a poor quality exists in the southern part of the island near Jebel Sawir; the remains of smelting furnaces, said to have been used by the Persians many years ago, are still to be seen.

The climate of Masira is generally healthy. In the North-east monsoon, the thermometer ranges from 68° to 78° Fahrenheit. Rain is very uncommon, but, judging from the enormous watercourses visible in all parts of the island, it must fall heavily at times.

East and North Coast of Masira.—**Ras Abu-Rasas**, the southern point of Masira island, is a low, rocky, sharp point, having the conspicuous conical hill, Jebel Sawir, 468 feet high, about 2 miles within or north-westward of the point.

Reefs.—About S.W. by S. 8 cables from the point is the small breaking patch Shab Abu-Rasas, with 5 and 6 fathoms water between it and the point. Shab Matreih, a coral reef with from 4 to 6 feet water, extends $1\frac{1}{2}$ miles westward of Shab Abu-Rasas, but there is a narrow 5-fathoms channel between them. E. by S. $1\frac{1}{4}$ and $2\frac{1}{2}$ miles from the point, are two other reefs, the nearest having 2 fathoms water, the other 4 or 5 fathoms, with from 10 to 13 fathoms between them. As the sea frequently breaks on all these reefs, the southern point of the island should not be approached to less than 3 miles.

From Ras Abu-Rasas, the eastern shore of the island trends north-eastward $10\frac{1}{2}$ miles to Ras Keida, with small rocky points and sandy bays between; the hills rising abruptly from the beach. The shore, northward of the reefs already mentioned, is bold, there being nowhere less than 5 fathoms within one mile of the shore, and no outlying dangers until off Ras Keida.

Ras Dtharri is a projecting rocky point 6 miles north-eastward of Ras Abu-Rasas; Jebel Dtharri is just within it.

Ras Keida is a small rocky point which may be known by a black double-peaked hill rising close to it.

Reef.—A coral reef lies E. $\frac{1}{2}$ N. $1\frac{2}{3}$ miles from Ras Keida, with 3 fathoms least water, and with from 7 to 10 fathoms between it and the shore. When the sea is smooth there is no indication of shoal water, but on the slightest swell rising, the sea breaks heavily. Vessels should therefore avoid anchoring on it, or on any of the shallow banks round the island.

From Ras Keida to Ras Zafarnát, a distance of 16 miles in a north-easterly direction, the coast recedes slightly, but is regular, with a low rocky beach, and with only one small sandy point occurring between the points named. The shore is safe to approach, the soundings being regular and there being no hidden danger.

Hakkan.—This small village is in a date grove close to the beach, 4 or 5 miles northward of Ras Keida. About 4 miles northward of Hakkan is the narrow central part of the island where it is only 4 miles across from shore to shore, the land consisting of low undulating hills.

Supplies.—Fresh water is procurable at the village of Hakkan, also a few pumpkins.

Ras Zafarnát is a rocky point from which the hills rise abruptly; it is less than 2 miles south-westward of Ras Yei.

Ras Yei, the eastern extreme of Masira island, is a bluff point formed by a ridge of hills extending eastward from the centre of the island, of which Jebel Mathrub is the highest and most conspicuous, being 620 feet

above the sea, and obtuse in form. From this point, Ras Jidufa, the north-eastern extreme of the island, bears N. by W. $\frac{1}{4}$ W. 10 miles.

The depths off Ras Yei are 15 fathoms at one mile, the edge of the bank in 100 fathoms being 10 miles off-shore.

Ras al Jezirat is a rocky point $3\frac{1}{2}$ miles north-north-westward of Ras Yei, between which two points the shore is rocky but free from danger, though the depth is under 3 fathoms when less than half a mile from the shore. It derives its name from a small sandy islet called Jezirat Janzi, lying close off and northward of it. The point is prominently marked by a black cove.

From Ras al Jezirat, the shore curves to the westward and then northward, forming a bay between it and Ras Jidufa, 7 miles distant. In this bay is a rock awash at low water, $1\frac{1}{4}$ miles from the shore, with Ras Jidufa bearing N. $\frac{1}{2}$ W.; close round the rock the depths are $2\frac{1}{2}$ and 4 fathoms. The soundings in the bay are regular, there being from 7 to 9 fathoms at 2 miles off-shore, the depth decreasing gradually towards it.

Ras Jidufa, the north-eastern extreme of the island, is a rocky point with a hill of the same name rising immediately behind it. Off the point a reef extends half a mile, with shallow water on its edge; the point should therefore not be approached in any direction nearer than one mile.

Anchorage.—There is anchorage in 7 fathoms, sand and rock, about $1\frac{1}{2}$ miles N.N.W. of Ras Jidufa, but it is said not to be good, probably on account of the nature of the bottom.

Ras Hilf, the north-western point of the island, is low and sandy; at $1\frac{3}{4}$ miles southward of it, and near the western shore, is Jebel Hilf, a moderately high black hill. The coast between Ras Jidufa and Ras Hilf is fronted by several patches of rocks, dry at low water, extending from a quarter to half a mile off-shore.

Shoals.—Between N. by W. from Ras Hilf and N. $\frac{1}{2}$ E. from Ras Jidufa, and distant from 3 to 5 miles from the shore, are five patches with as little as $2\frac{1}{2}$ fathoms on them; between them and the island there are from $3\frac{1}{2}$ to 7 fathoms.

Between the North extreme of Masira island and the mainland, and as far northward as Ras Sheiballa, the ground is foul, with depths of from 2 to 4 fathoms, on which the sea rolls heavily during the North-east monsoon, rendering this end of the Masira channel unapproachable in that season, except in boats.

Clearing mark.—Jebel Jidufa bearing S.S.W. leads eastward of all these shoals.

MASIRA CHANNEL and West coast of Masira island.—The Masira channel, between Masira island and the mainland, is about 35 miles in length, by from 8 to 12 miles in width. Near its northern end, though its width between Ras Shanna on the mainland and Ras Hilf, Masira island, is no less than $8\frac{1}{2}$ miles, its navigable width, with a depth of only about 3 fathoms, at low water, is restricted to $2\frac{1}{2}$ cables or less, and it should not be attempted at all by vessels unless bound to Umm Rasas. The channel is used by native vessels of about 40 tons. See directions at page 468.

Kinasat Hilf is a shoal, partially dry at low water, between the northern entrance points of the Masira channel and bearing W. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from Ras Hilf, with depths of from 3 to 7 fathoms between it and the Ras. Between it and Dimna reef, extending from the shore of the mainland, the depth is but $1\frac{1}{2}$ fathoms, sandy bottom, the channel thus lying eastward of Kinasat Hilf and along the western shore of the island.

From Ras Hilf, the north-western point of Masira, the coast trends south-westward 11 miles to Ras Shaghaf, forming a slight curve and fronted by a bank which dries at low water from 5 to 8 cables off-shore, rocky foul ground extending in places from one to 2 miles from the beach.

Daua or Datta is a small village in a grove of date trees close to the shore and 2 miles northward of Ras Shaghaf.

Water.—Good water may be obtained by ships' boats at Datta, and there is good anchorage for them on the western side of Jezirat-bin-Juwaisim, a small island off that place presently described. Good water may also be obtained at Ras Shaghaf, off which there is anchorage in 4 or 5 fathoms, at from one to $1\frac{1}{2}$ miles from the shore.

Beiyat-bin-Juwaisim.—Jezirat-bin-Juwaisim is an islet 2 miles from the Masira shore, and near the eastern edge of Beiyat-bin-Juwaisim, which shoal is $7\frac{1}{2}$ miles long N.E. by N. and S.W. by S., by 3 miles wide, and the greater part dries at low water. There is good anchorage for boats on the western side of the island, there being a split in the reef on its north-western side which allows boats to get close to it. The northern edge of Beiyat-bin-Juwaisim shoal is one mile from Kinasat Hilf, and there are only from 2 to 4 fathoms between them. On either side of the shoal is a navigable channel for small craft, with from 3 to 4 fathoms water. See directions, page 469. Near the south-western edge of Beiyat-bin-Juwaisim, where the general depths are 3 and 4 fathoms, is a small patch of 2 fathoms.

From Ras Shaghaf, the coast trends more southward to the town of Umm Rasas, about 3 miles distant, and from thence 3 miles farther southward, and then westward about the same distance, forming the deep bight

of Umm Rasas. In this bight lies the low sandy island Jezirat Shagha, which cannot be approached within $1\frac{1}{2}$ miles on account of a bank, which, extending from the southern shore of the bight, surrounds the island at that distance, and dries at low water; between Jezirat Shagha and the eastern shore of the bight is a narrow inlet presently described.

At the southern end of Beiyat-bin-Juwaisim, the channels round that reef join, being bordered on the eastern side by the rocky ground extending off Masira; and, on the West, by the bank of foul ground which extends from 6 to 8 miles from the mainland, and terminates at Jezirat Sanfar, one of the Oyster islets. The depths in the channel are from 4 to 8 fathoms, and the width from 4 miles off Ras Shaghaf to 7 cables only between the Oyster islets and the rocky bank extending from the Masira shore northward of Ras Kalbán.

Hassar Walad Henal.—Westward of Umm Rasas and on the edge of the western bank of the channel, is Hassar Walad Henal, a dangerous sunken rock with only 2 feet water and steep-to, from which Jebel Kairán bears S. $\frac{1}{2}$ E., and Jebel Safaij is in line with the southern point of Jezirat Shagha.

Umm Rasas is the only village of the island, and the residence of the sheikh; its population, together with that of Safaij, a suburb contiguous to it, was estimated in 1892 at about 100 people, the whole island containing only 300, who carry on a trifling trade with Maskat. The town is fronted by the low island Jezirat Shagha, surrounded by the flat before mentioned. Between this flat and the town is an inlet running close to the shore and entered from the northward. It has from $1\frac{1}{2}$ to 3 fathoms water, runs in $3\frac{1}{2}$ miles, and is from 2 to 4 cables wide; by it, small craft can get close up to the town.

Jebel Safaij is a conical hill close southward of the village of that name, with the remains of a fort on the summit.

From the western point of Umm Rasas bight, the coast trends S.W. $\frac{1}{2}$ S. 8 miles to Ras Kalbán; it is rocky and irregular with small projecting points, and is fronted by a rocky bank with rocks above water, to the distance of three quarters of a mile from the shore.

Ras Kalbán is a low rocky point, with a sandy beach on either side of it, from whence the coast trends south 11 miles nearly, to Ras Abu-Rasas, the southern extreme of Masira island.

Jebel Kairán, or Saddle hill, is a remarkable double-peaked hill, elevated 385 feet above the sea, one mile from the beach, and nearly 4 miles north-eastward from Ras Kalbán. The village of Kairán is at the south-western foot of the hill.

Oyster Islets.—North-westward of Ras Kalbán are these three rocky islets. Between Jezirat Sanfar, the northern islet, and Jezirat

Al-Hara, the next, which bears S.W. 2 miles from it, are two patches of sunken rocks, and there is from 2 to 3 fathoms water on the bank between the islands and the rocks. Jezirat Amkads, the southern islet, lies W.N.W. one mile from Ras Kalbán, and makes from the south-westward as a patch of sand with a small black rock at its western end. The islet can be seen about 7 miles.

SHOALS.—A shoal about 5 cables in length N.N.W. and S.S.E., and with about $1\frac{3}{4}$ fathoms water, lies with its northern extreme one mile W. by S. of Amkads. Shallow water also extends a short distance northward of the islet.

Zanatiyat, a dangerous group of rocks about $1\frac{1}{2}$ miles in extent, with one rock which dries at half tide and others with apparently less than 6 feet water on them, and from 4 to 6 fathoms around, lies with Ras Kalbán bearing N.E. $\frac{3}{4}$ E. 3 miles.

In 1877, H.M.S. *Arab* reported a depth of $2\frac{1}{4}$ fathoms nearly 3 miles south-westward of Zanatiyat reef, with Jebel Sawir bearing S.E., and Jezirat Amkads N.E. $\frac{3}{4}$ N.

From Ras Kalbán to Ras Abu-Rasas, the southern point of the island, described at page 462, the shore is low and sandy, with several low points. At $1\frac{3}{4}$ miles northward of Ras Abu-Rasas, and close in-shore, are two islets, and $1\frac{1}{4}$ miles farther northward are three more islets lying in an east and west direction, with some sunken rocks beyond them, extending altogether nearly $1\frac{1}{4}$ miles from the shore. The whole collectively are called Banat Murshid.

Kalbán is a small village close to the shore, about 5 miles from the southern point of the island.

Shab Sanfar is a reef nearly awash, 8 cables long north and south by 5 cables wide, and its centre and shoalest part distant from the shore $2\frac{3}{4}$ miles, with Jebel Sawir bearing E. $\frac{3}{4}$ S. This shoal usually breaks, and may be seen from the masthead at a considerable distance.

The WESTERN SHORE of the MASIRA CHANNEL for the first 13 or 14 miles from Ras Mishsiýu, its southern extreme, is low and rocky with intermediate sandy patches; when within 11 miles of Jezirat Maáwal it becomes sandy, and so remains as far as and beyond Ras Shanna.

Beiyat Dimna is a very extensive reef, the greater part of which dries at low water; commencing from the shore about 10 miles north-eastward of Ras Mishsiýu, it gradually increases in width until abreast of Ras Shanna, where it extends nearly 6 miles from the shore, and dries $4\frac{1}{2}$ miles out into the Masira channel. Abreast of Ras Shanna, the reef ends, but shallows of $1\frac{1}{2}$, 2, and 3 fathoms extend almost across to the northern end of Masira island.

From the head or north-eastern end of Beiyat Dimna, a sand-bank, with from $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water, extends southward as far as the Oyster islets, forming the western side of the navigable portion of the Masira channel; from thence it turns sharply back towards the mainland and rejoins the shore about where Beiyat Dimna shoal commences. A small reef of rocks, covered at high water, lies about 2 miles off-shore on this inner part of the sand-bank.

Ras Shanna is the low sandy point forming the western point of the northern entrance to the Masira channel. It bears N.W. by W. $\frac{3}{4}$ W. $8\frac{1}{2}$ miles from Ras Hilf on Masira island, the eastern point of entrance.

At 3 miles southward of Ras Shanna is Jezirat Maáwal, a low wooded islet connected with the mainland at half-ebb; a creek in the reef open from the northward, and navigable for boats, leads up to it.

Tides.—It is high water, full and change, at the town of Umm Rasas at 10h.; springs rise 10 feet. The flood sets westward round the northern point of the island, and S.S.W. down the channel; round the southern point, the flood sets W.N.W., and from thence N.N.E. up the channel, the two streams meeting about off the town. The ebb sets the contrary way to the flood. The velocity of the tides varies from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles an hour.

DIRECTIONS for the Masira channel.—During the North-east monsoon, and in bad weather, the sea breaks heavily on the foul ground off the northern entrance, at which time that channel should not be attempted. At all times the southern entrance is preferable, it being much the wider and deeper of the two, but great caution must be used in its navigation until it is better known, as shoals may exist which do not appear on the chart and the depths may be less in places than those shown; in addition to which, there is an absence of good leading marks.

North entrance.—If the weather is clear, the line of the shoals is generally well defined, and it is said that little danger or difficulty would be experienced by vessels of suitable draught, except northward of Jezirat-bin-Juwaism, where the greatest depth at low water appears to be 3 fathoms, and the channel in one place is scarcely more than 2 cables wide.

Approaching from the north-eastward, Jidufa hill, at the north-eastern extreme of Masira island, should be kept bearing westward of S.S.W. in order to avoid the shoals and foul ground northward of the island; in thick weather, do not stand into less than 15 fathoms, as the water shoals quickly within that depth. When within $1\frac{1}{2}$ miles of Ras Jidufa, haul to the westward, keeping about a mile off-shore until Ras Hilf bears South, in order to avoid the 2-fathoms elbow of the shoal extending 7 or 8 cables half a mile N.N.E. from it; then steer to pass Ras Hilf at from 3 to

See plan, No. 1,089.

5 cables. After passing Ras Hilf, steer S.W. $\frac{3}{4}$ S. for Jezirat-bin-Juwaissim until Jebel Hilf approaches the bearing of E. by N.; here the channel between the reefs is less than a quarter of a mile wide, with about 3 fathoms water, and a short distance farther on is a $2\frac{1}{4}$ -fathoms patch in mid-channel, which may be passed on either side. The piloting of this part of the channel should be done from aloft. When southward of this narrow part, steer about S.W. by S., passing from 6 to 8 cables eastward of Jezirat-bin-Juwaissim; about the same course should carry the vessel to the anchorage off Umm Rasas, where a vessel may anchor in 3 fathoms, with the tower bearing S.E. $\frac{1}{2}$ S. and Jebel Kairán S.S.W. $\frac{1}{4}$ W., a convenient spot from which to communicate with the town. There are from 4 to $4\frac{1}{2}$ fathoms a little farther off-shore.

Another and wider channel leads northward and westward of Beiyat-bin-Juwaissim; but the eastern channel, being the more direct, is perhaps preferable.

To pass through this north-western channel, however, proceed round Ras Hilf as before directed until Jebel Hilf bears E. $\frac{3}{4}$ S.; then keep it on that bearing astern until Jezirat-bin-Juwaissim bears S. by E. $\frac{1}{2}$ E.; then steer S.W. until the same islet bears E. by S. $\frac{1}{4}$ S., when a course may be steered for Jebel Kairán about S. by W., and when the tower at Umm Rasas bears S.E. $\frac{1}{2}$ S., steer for it to the anchorage.

The navigable channel abreast of the town is 2 miles wide, increasing in width at first to the northward, until nearly blocked by the shoal Beiyat-bin-Juwaissim, and decreasing to the southward. The eastern side is bounded by the bank of rocky ground, with some rocks above water, which extends from the shore of the island, and should not be approached to less than 8 cables or a mile. The opposite side of the channel is bounded by a sand-bank with from $1\frac{1}{2}$ to 2 fathoms water on it, and steep-to. The depths in the channel vary from 4 to 7 fathoms.

South entrance.—In the southern entrance to the Masira channel the depths are from 7 to 9 fathoms, sand and coral, with occasional overfalls, decreasing to 6 and 5 fathoms near the Oyster islets, and a least depth of $4\frac{1}{2}$ fathoms should be maintained as far as Umm Rasas.

Entering the channel from the southward or south-eastward, Ras Abu-Rasas may be rounded at a distance of 4 miles; from thence a N.N.W. course should be steered, gradually increasing the distance from the island to avoid the off-lying shoals and shallow ground, until Jebel Kairán bears N.E. by E. $\frac{1}{4}$ E., when a N.E. course should be steered for Jezirat Al-Hara, keeping this islet on that bearing until Jezirat Amkads bears E. $\frac{1}{2}$ S., when the course may be altered to E. by N. $\frac{1}{2}$ N. to pass midway between Jezirat Al-Hara and Jezirat Amkads until the latter bears S.W. $\frac{3}{4}$ S., when it should be kept on that bearing astern, the vessel

steering up through the channel on a N.E. $\frac{3}{4}$ N. course to the anchorage off Umm Rasas.

If desirous of entering the narrows southward of Jezirat Amkada, that islet may be steered for when it bears N.E. by E., passing northward of the Zanatiyat shoals and southward of the shoal whose southern end lies S.W. by W. $\frac{1}{2}$ W. one mile from Jezirat Amkads; from thence passing about 3 cables southward and eastward of Amkads and bringing it to bear S.W. $\frac{3}{4}$ S. astern, as before. Jezirat Amkads may, if necessary, be passed at 3 cables on its western side, between it and the shoal lying westward of it; but, if so, in hauling into the channel northward of it, care must be taken to avoid the shallow water extending a short distance from its northern side.

The COAST.—**Ras Sheiballa**, in lat. $20^{\circ} 58' N.$, long. $58^{\circ} 49' E.$, is a low rocky point on the mainland, about 16 miles northward of Masira island; the coast between it and Ras Shanna, 13 miles south-south-westward of it, being very low, sandy, and covered with bushes.

As before stated, a bank of foul ground, with from 2 to 4 fathoms water, extends from Ras Sheiballa to the island of Masira, on which the sea rolls heavily during the North-east monsoon. See page 464.

Sheiballa village.—About a mile inland from the point is Sheiballa village, containing about 200 inhabitants of the Jeneba tribe.

The Jeneba have but few boats, and being very poor are obliged to have recourse to the kirbeh, an inflated sheepskin. It is commonly used by the inhabitants of this coast from Ras al Ruweis to Khorya Morya bay. But with the poor Jeneba its use is seen in perfection. As soon as a shoal of fish is viewed from the heights by those watching for them, the whole assemble, and seizing their skins and casting-nets, rush to the water's edge. Here the skin is quickly soaked and inflated, after which the hind and fore legs are tied together with a string. Thus prepared, they step into the ring, and, slipping the skin up towards the lower part of the stomach, throw their casting-nets across the left shoulder, and wading into the water up to their necks, sit upon the string, which rests against the back part of their thighs, and thus paddle away with their hands to the place where the fish are. In this way as many as twenty at a time will enter the water and swim out a distance of a couple of miles. When they have arrived among the fish, they throw their casting-nets, and, gathering them up, return to the shore with what they may contain, having no means of securing the fish on the spot.

Supplies.—A few goats may be obtained here, as at nearly all the villages on this part of the coast.

The coast.—From Ras Sheiballa, the coast trends N.E. 43 miles to Ras Jibsh, with the villages of Ghalât, Sherkh, and Grun lying

See chart, No. 10c.

between ; Sherkh, situated about midway, is said to be the seaport of a considerable community residing a short distance inland, who foster the slave trade. For 13 miles the land rises in cliffs from 30 to 70 feet high, with sandy spaces intervening ; after which it presents an unvaried line of low sand downs without the slightest trace of vegetation or inhabitants. A heavy surf breaks on the shore, which renders landing impracticable.

From Ras Jibsh to Ras al Khabba, the coast trends N.N.E. $\frac{1}{2}$ E. for a distance of 53 miles ; it is all low and sandy, and of an uniform desolate appearance, with several small isolated hills near the shore, one of which, Jebel Jifan, is of round form.

Inhabitants.—Caution.—The whole coast from Ras Minji as far northward as Ras Jibsh, a distance of about 330 miles, is mainly inhabited by the Jeneba tribe, who bear a generally bad character. From Ras Jibsh to Ras Al-Hadd, the inhabitants are of the Bu-Ali tribe, and are friendly to Europeans.

The country bordering on the sea between Ras Jibsh and Ras Al-Hadd is styled Al-Askhara, or the eastern country, and forms no portion of the province of Omán, which lies contiguous to it on the West and near the coast. It is entirely destitute of vegetation near the shore, but in the interior it has extensive date groves and running streams, with small patches of cultivation, chiefly jowari and cotton.

Ras Jibsh is a small sandy point, having immediately over it a hill about 100 feet in height, nearly covered to the summit with white drift sand, three little dark peaks showing above the sand. On the centre peak are the remains of an old tower. On the south-western slope of the hill is a village containing about 60 inhabitants. In clear weather, Jebel Jaalan, 3,900 feet high and wedge-shaped, may be seen when off Ras Jibsh.

Landing.—On the northern side of Ras Jibsh is a small bay, affording good landing in southerly winds, but much exposed to north-easterly winds.

Depths.—The soundings in this vicinity are very regular, the 20-fathoms line being $3\frac{1}{2}$ miles off Ras Jibsh, and increasing its distance from the shore to the southward. The shore may be safely approached in any part to a depth of 5 fathoms.

The bank of soundings decreases in width northward of Ras Jibsh, where the 100-fathoms contour-line is about 11 miles from the land, until at Ras al Khabba it is only 2 miles from the shore, and the 20-fathoms line one mile only ; the lead, therefore, gives but little warning here. The soundings southward of Ras al Khabba are regular, and the shore may be approached anywhere to the distance of one mile.

AL-ASKHARA is a long straggling town and fort 27 miles north-eastward of Ras Jibsh, containing about 1,000 inhabitants of the Bu-Ali tribe. This place was visited by H.M.S. *Arab* in 1877; the country in the neighbourhood was reported to be a perfect desert, affording no supplies beyond a few goats and fowls.

Anchorage.—North-eastward of the town is a rocky point, the shore from which sweeps round north-westward, forming a small bay, with apparently a clean and clear bottom, the soundings decreasing gradually to the beach. The *Arab* anchored in $7\frac{1}{4}$ fathoms water, from 5 to 7 cables from the beach. Landing was effected without difficulty in this bay, although the surf broke heavily on the shore on either side of it.

The water in the vicinity of Al-Askhara is varied and changeable in its colour.

Jebel Seih, an oblong black hill several hundred feet high, bears N.W. by W. $\frac{1}{4}$ W. 6 miles from Al-Askhara, and has a haycock or conical hill a short distance north-eastward of it. Jebel Seih, when bearing W.N.W., forms a saddle and is a good mark for making the place.

Ras Gumeila is a low sandy point about 9 miles north-eastward of Al-Askhara, backed by a ridge of low hills, one of which, Jebel Gumeila, is of a conical form, but is not easily discernible from the north-eastward. The rather large town of Gumeila is about one mile northward of the point. Water may be obtained here.

Khor Beni-bu-Ali.—At $5\frac{1}{2}$ miles northward of Ras Gumeila, with Jebel Jaalan bearing N.W. by W. $\frac{3}{4}$ W. is a large black rock which effectually masks the entrance to the khor Beni-bu-Ali, discovered by H.M.S. *Kingfisher* in 1886. Shoal water apparently extends some distance northward of the rock, between which and the land there is stated to be a depth of one fathom at low water, leading into the khor, but the passage is not practicable during the South-west monsoon, as a considerable sea sets in. The khor has two arms, and is reported to be as large as khor al Hajar, see page 475, but has not been examined. It affords shelter to coasting and fishing craft, and is occasionally used by slave dhows, the slaves being marched overland to Sur.*

About 30 coasting craft were hauled up in the khor in the summer of 1886, when visited by H.M.S. *Sphinx*. A fort and one stone house are situated about two miles northward of the khor, and a considerable village, named Suweih, consisting of mud huts, exists here during the North-east monsoon, but the villagers take to the hills during summer.

* No entrance to this khor could be found by H.M.S. *Cossack* in April 1891; the rock appeared to be on the beach, and the passage closed.

See chart, No. 10c.

Ras ar Ruweis is a low rocky point with a few sandy hillocks, about 3 miles south-westward of Ras al Khabba. Here is a village containing about 300 inhabitants, of the Bu-Ali tribe.

From 2 to 4 miles southward of this point, a coral bank of from 7 to 10 fathoms water, with overfalls, extends about 2 miles off-shore.

Jebel Jaálan.—This conspicuous mountain, its highest peak in lat. $22^{\circ} 13' N.$, long. $59^{\circ} 22' E.$, and about 19 miles inland from Suweih, the nearest part of the shore, is 3,900 feet high, and in clear weather may be seen at a distance of 60 miles. At the southern slope are the chief towns of the Bu-Hassan and Bu-Ali tribes, who are rather friendly to Europeans.

RAS AL KHABBA is a low rocky point. Here the sandy shore terminates, and cliffs of from 60 to 100 feet in height extend with but a few short breaks to within 3 or 4 miles of Ras Al-Hadd. All this part of the coast is very bold and with no safe anchorage.

From 20 miles southward of Ras al Khabba, the high mountains of Kalhát will be seen towering behind Jebel Jaálan.

Anchorage.—There is tolerable shelter from northerly winds in 6 fathoms, with Ras al Khabba bearing N.E. by N. about 2 miles.

Jebel Khamis, 2,700 feet high, is a rugged peak of dark colour, and is seen to the northward of Jebel Jaálan from off Al-Askhara.

Ras al Juneiz, the most eastern point of Arabia, is in lat. $22^{\circ} 26' N.$, long. $59^{\circ} 50\frac{1}{2}' E.$, and is 7 miles southward of Ras Al-Hadd. It is a low cliff, off which, at the distance of 2 miles, there is a depth of 100 fathoms.

Jebel Sifan consists of two remarkable hills close together, south-westward of Ras al Juneiz. They are quoin-shaped, of equal height, 850 feet above the sea, with their steep faces westward, and stand on a table-land 100 feet in height. Being isolated and close to the shore, these hills, visible above 30 miles, make good landmarks for identifying Ras al Juneiz; and, when the comparatively low land in that vicinity is below the horizon about 15 miles distant, they appear, either from the northward or southward, like an island with a deep notch in it.

RAS AL-HADD.—The low cliffs of Ras al Juneiz sink into a low sandy shore 3 miles southward of this cape, which is a low sandy point not easily made out, with a few date trees in the little town of Al-Hadd, one mile south-westward of the point. The town consists of three round towers and a number of mat huts, with a population of about 700 of the Beni Ghazal tribe; a fourth round tower stands detached on Ras Dhaletya on the shore of Khor al Hajar. The people are civil, as is the case at all the towns northward of this and subject to the Sultan of Maskat. The authority of that prince southward of this point is quite nominal.

Supplies.—A few goats may be procured here, and there is an abundance of fish. Fairly good water, but only in small quantities, may be obtained.

Anchorage.—There is anchorage in from 8 to 10 fathoms water, coral bottom, from 5 to 8 cables off-shore, with the town of Al-Hadd bearing West. The water shoals rapidly from 10 fathoms to 7, 6, and 5 fathoms, the bottom being distinctly visible. This anchorage is quite exposed to all winds from the sea. In the South-west monsoon, the best anchorage would be between the entrances to Khor al Hajar and Khor Jarama, in 12 fathoms, a quarter of a mile from the shore. Ships, however, at this or any anchorage between Ras Al-Hadd and Sur, must always be prepared for a sudden shift of wind to the northward.

The temperature at this anchorage, varying from 83° in the daytime to 74° at night in September, has been found to be quite a relief after the suffocating heat at Maskat, where it ranges from 86° to 95° , sometimes remaining near the maximum all night; the air is also dryer than to the southward of Ras Al-Hadd during the South-west monsoon as it loses some of its moisture in passing over the land.

Tides.—It is high water, full and change, at Ras Al-Hadd, at 9h. 30m.; springs rise 9 feet.

The currents off Ras Al-Hadd are variable and strong, and are much influenced by the prevailing winds.

During the South-west monsoon, the current has been found to set northward along and parallel with the coast at about half a mile to $1\frac{1}{2}$ miles an hour from Ras Madraka until abreast of Ras Al-Hadd; at the same time, the current sets south-eastward down the coast from Ras Abu Daud to Sur, and from thence about E.N.E. to Ras Al-Hadd, off which cape the two currents appear to meet, both being deflected to the north-eastward and attaining a rate of about 2 miles an hour, at times still farther increased by the ebb stream along the southern shore of the gulf of Omán. Vessels lying-to at night off Ras Al-Hadd have found themselves out of sight of land at daylight.

Challenger bank.—About 40 miles eastward of Ras Al-Hadd, in lat. $22^{\circ} 29' N.$, discoloured water with rippings was observed from H.M.S. *Challenger* in 1830, and two casts of 13 fathoms were obtained, with no bottom at 65 fathoms soon afterwards, the sea having then resumed its natural colour. The bank appeared to be 3 miles long by half a mile wide. The *Palinurus*, while surveying the coast, and other vessels, have repeatedly made diligent search for this bank, but without success.

In 1885, H.M.S. *Ranger* reported a depth of 55 fathoms, sand and rock, at about 18 miles south-eastward of Ras Al-Hadd; the approximate position being lat. $22^{\circ} 23' N.$, long. $60^{\circ} 4' E.$ The same vessel was unsuccessful

See chart, No. 10c, and plan, No. 228.

when searching for this bank on a subsequent occasion, no bottom being obtainable at 80 fathoms.

The Coast.—From Ras Al-Hadd the coast trends sharply to the westward for 15 miles to the town of Sur, and the 100-fathoms contour-line is at an average distance of 3 miles from the shore. From Sur the coast sweeps gently north-westward to Ras ash-Shajar, the mountain range of Jebel Kalhát descending precipitously to the sea, with very deep water close to the shore and no off-lying dangers. Cliffs recommence 2 miles westward of Ras Al-Hadd and extend for 6 miles.

Khor al Hajar, at 2 miles westward of Ras Al-Hadd, is a small and shallow inlet used by fishing-boats. Its entrance, between the two low cliffs, Ras al Haiya on the east and Ras al Hamma on the west, is $1\frac{1}{4}$ cables wide and has from 5 to $3\frac{1}{2}$ fathoms, but it soon shallows to $1\frac{1}{2}$ fathoms; the inner half of the inlet is dry at low water spring tides. Its direction is S.S.E. for half a mile, and then East one mile, reaching close to the back of the town of Al-Hadd. A small vessel can anchor near the entrance in 4 to 5 fathoms, but would have no shelter from the north-west.

Tides.—At the anchorage off Khor al Hajar, recently described, the flood tide runs to the westward, the ebb to the eastward; the flood stream is always weak; the greatest velocity of the ebb appears to be about $1\frac{1}{2}$ knots.

KHOR JARAMA, the entrance to which is $1\frac{1}{2}$ miles westward of Khor al Hajar, is a large shallow basin $2\frac{1}{4}$ miles in length north-west and south-east, by an average width of one mile. The channel leading to it lies between cliffs 60 feet in height, is very tortuous, about one mile long and 150 yards wide, with an island at the inner end, dividing the channel, the passage on the eastern side of this island being the better of the two. This khor affords excellent shelter, and is easily accessible to steam-vessels drawing not more than 15 feet water.

A white beacon, stone and of conical form, 10 feet high, stands on Ras Darra du Búraiij, the eastern point of entrance.

The depths are 4 to 6 fathoms, mud, between the entrance points, but at a quarter of a mile within them shoal ground of 7 to 8 feet extends from the western shore, leaving on the east side a channel only 60 yards wide, from cliff to shoal, with apparently a least depth of $3\frac{1}{2}$ fathoms. After this shoal part is passed, the depths are from $4\frac{1}{2}$ to 9 fathoms, passing eastward of the island, until the basin is entered, where there is a considerable anchorage space with from 4 to $4\frac{1}{2}$ fathoms close to the island; the depths in the inner part of the basin being only from $2\frac{1}{2}$ to $1\frac{1}{2}$ fathoms. The passage westward of the island has only 2 fathoms water.

The southern shore of Khor Jarama is low, with a mangrove swamp, but there is an isolated black flat-topped hill on its south-west side, which is a good mark. An abundance of fish may be taken in this harbour with the seine.

Tides.—It is high water, full and change, at 9h. 30m.; springs rise 10 feet. The velocity of the tide in the entrance channel is 2 miles an hour.

Anchorage.—In the South-west monsoon there is good anchorage on the bank off the entrance to Khor Jarama, half a mile from the shore in 10 or 12 fathoms, mud and sand, with the low west point apparently halfway across the entrance channel, and Ras Al-Hadd tower E. by S. $\frac{3}{4}$ S.; but it would not be safe in the North-east monsoon. This is a cooler and more pleasant anchorage than Maskat in the hot season.

Directions.—From the offing, the hill on the south-western side of Khor Jarama appears as a truncated cone and is a good mark; bearing S.W. by S. it leads up to the entrance, which may be identified by the white conical beacon on Ras Búraiij. When entering, keep close to the eastern side until past the shoal a quarter of a mile within the entrance, remembering that the channel here is only 60 yards wide from cliff to shoal. Then keep in mid-channel, pass on the eastern side of the island dividing the passage, and anchor as convenient directly the island is passed. Flaws of wind are prevalent; sailing vessels should therefore be provided with a stern anchor.

The place is only used by native vessels as a harbour of refuge, as there is no village on its shore, and no water procurable. There are beaches on which the seine may be hauled.

Ras Sherh is a slightly projecting point of the cliff 8 miles W. by N. of Ras Al-Hadd; from this point to Sur, there is a ridge of low broken hills with patches of cliff.

SUR is a large town, or rather two towns, situated on a khor or backwater, 15 miles westward of Ras Al-Hadd. There are two forts surrounded by huts westward of it, all included under the general denomination of Sur. The total number of inhabitants may be 10,000. When in line with Sur khor, Jebel Khamis bears S.W. by S.; this may be useful as a guide to find the place. Just northward of Sur the bank of soundings is only one mile wide.

The larger town, on the east bank of the khor, is called Heija, and is inhabited by the Beni Bu-Ali; the other, Umm Kareimatein, by the Beni Janaba, who are often at feud with each other. Of the two forts, the south-western and larger called al Heis is for the protection of the wells, the other is called Seneisala; the country inland is partially cultivated, and there are many date groves.

The khor is extensive, but narrow at the entrance, with a bar having only 3 feet at low water ; within it there are 2 or 3 fathoms. Inland, 2 miles to the southward, there is another town in a date grove which has a good bazaar.

There is little to be seen of the town of Sur from the sea ; the two forts on higher ground are first visible.

The Sheikh levies a tax of four dollars on every dhow passing over the bar, and a tax is made also on each passenger. Native craft lie in the khor, and the place appears to be the centre of a considerable traffic in slaves. The Sultan of Maskat maintains a garrison in al Heis.

Trade.—A large trade is carried on between this place and India, Zanzibar, and the Persian gulf, in baghalas ; Sur also possesses numerous fishing boats, which frequent the whole coast of Arabia. The exports are dried dates and salt fish, and the inhabitants manufacture a coarse cloth for turbans, &c. Many natives of Kutch (Banyans) are settled here, and the trade is very much in their hands. The Sur people are characterised by a spirit of enterprise, and are bold sailors.

Supplies.—Cattle and vegetables might be obtained here, but it is doubtful whether water could be spared for a vessel.

Anchorage.—There is anchorage off the town in from 10 to 15 fathoms, sand, about 5 to 8 cables from the shore. There is also anchorage in 5 fathoms water, about a mile off the easternmost tower of Seneisala. The water here is very clear, and the bottom can be seen at the depth of 10 fathoms. It is quite an open roadstead.

For a continuation of the description of this coast to the northward, *see* Persian Gulf Pilot.

See chart, No. 10c.

PLACE.—SUEZ. Obs. Δ LAT. 29° 58' 0" N., LONG. 32° 33' 0" E.

METEOROLOGICAL TABLE COMPILED FROM SEVENTEEN YEARS' OBSERVATIONS.

MONTH.	BAROMETER, Reduced to 32° and Sea Level.		TEMPERATURE.					Relative Humidity.		RAIN.		WIND.										No. of Days Gales.	No. of Days Fogs.	REMARKS.				
	Mean Height.	Ex- treme Range.	Mean.	Mean Daily Range.	Max.	Min.	Clouds, 0 to 10.	Total Fall.	No. of Days.	Average Velocity.	Number of Days from																	
											N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.									
January	Ins. 30.06	Ins.	55	21	75	34	59	2	Ins. 0.22	2	Not recorded.	10	2	1	2	6	4	1	4	1							*Relative Humidity obtained from the observations made at 7 a.m. and 2 p.m.	
February	30.03		57	22	83	39	57	2	0.06	1		9	2	0	2	6	4	1	4	0								†In May 1888, the total fall of rain was 2.66 inches in 3 days. Excluding this exceptional fall, the mean fall for May is only 0.63 inch.
March	29.97		62	24	97	38	52	2	0.08	2		12	1	0	2	6	3	2	5	0								In April, the monthly mean fall varied from 0 to 1.01 inches, and in January from 0 to 1.18 inches.
April	29.92		69	27	102	45	48	1	0.18	1		14	1	0	1	6	2	1	5	0								
May	29.90		75	29	110	50	46	1	0.20†	1		18	2	0	1	4	1	0	5	0								
June	29.86		80	29	117	61	46	0	0.00	0		21	2	0	0	1	1	0	5	0								
July	29.79	Not recorded.	83	27	108	61	50	0	0.00	0		21	3	0	0	1	1	0	4	1								
August	29.77		83	26	111	63	53	0	0.00	0		21	3	0	0	0	0	0	5	2								
September.	29.90		79	25	105	59	53	0	0.00	0		22	2	0	0	1	0	0	4	1								
October	29.97		75	23	103	51	56	1	0.00	0		19	2	1	0	1	1	0	5	2								
November.	30.03		65	22	94	39	57	1	0.04	1		15	3	1	1	2	2	0	4	2								
December	30.05		59	21	81	33	59	2	0.08	2		10	3	1	1	6	4	1	4	1								
Means and Totals	29.94		70	25	117	83	53	1	0.86	10	192	26	4	10	40	23	6	54	10									

PLACE.—SAWÁKIN. OBS. Δ LAT. 19° 7' 0" N., LONG. 37° 20' 0" E.

METEOROLOGICAL TABLE COMPILED FROM ONE TO FIVE YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.	RAIN.		WIND.										REMARKS.	
	Mean Height.	Ex- treme Range.	Mean.	Mean Daily Range.	Max.	Min.		Total Fall.	No. of Days.	Number of Days from											
										N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.			
	Ina.	Ina.	°	°	°	°	Clouds, 0 to 10.	Ina.		Average Hourly Velocity.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gales.	No. of Days Fogs.
January -	30.01	Ina.	78	°	°	°	3	Ina.		4	21	0	0	0	0	0	0	10	0	0	0
February -	29.99		77				2			2	13	8	0	0	0	0	1	5	1	0	0
March -	29.89		77				3			3	8	12	2	1	0	0	0	3	5	6	0
April -	29.85		79				2			2	8	7	4	1	1	0	0	4	5	0	0
May -	29.81		83				3			2	7	7	4	1	1	1	1	5	4	0	0
June -	29.76		88				2			2	10	6	3	1	1	1	0	5	3	0	0
July -	29.72		89				3			2	7	6	2	1	1	4	2	4	4	0	0
August -	29.71		91				3			3	6	3	2	1	1	5	3	7	3	0	0
September -	29.74		88																		
October -	29.87		87																		
November -	29.96		83				3			3	18	0	5	0	0	0	0	7	6	0	0
December -	29.99		78				6			3	9	2	7	2	0	2	0	9	0	0	0
Means and Totals - }	29.86		83																		

PLACE.—MASSAWA. OBS. Δ LAT. $15^{\circ} 37' 0''$ N., LONG. $39^{\circ} 27' 0''$ E.

METEOROLOGICAL TABLE COMPILED FROM ONE TO ELEVEN YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				RELATIVE HUMIDITY.		RAIN.*		WIND.							REMARKS.					
	11 yrs. Ins.	Ins.	Mean Height.	Ex- treme Range.	Mean Range.	Max.	Min.	Clouds, 0 to 10.	Total Fall. Inch.	No. Days, Aver. Inch.	Number of Days from							No. of Days Gale.	No. of Days Fog.				
											N.	N.E.	E.	S.E.	S.	S.W.	W.				N.W.	Calm.	
January	78	Ins.	6 yrs. 78	0	3 yrs. 92	66	55	6	1.62	3 yrs. 6	11 yrs. Ins.	8	8	4	1	0	1	4	3	2	0	0	• The total fall is based on 11 years' observations, but the number of days on only three.
February	78		78		93	66	84	5	0.79	6	2	7	5	4	1	1	1	4	3	2	0	0	
March	81		81		95	68	80	5	0.66	7	2	10	10	3	1	1	1	0	4	1	0	0	
April	85		85		97	71	79	5	0.07	3	2	11	8	4	0	0	0	2	1	4	0	0	
May	86		86		104	77	63	3	0.46	2	3	17	3	0	3	1	0	1	2	4	0	0	
June	92		92		106	77	52	2	0.00	0	2	8	4	3	3	1	1	6	2	2	-	-	
July	94		94		108	85	59	3	0.12	0	2	11	5	4	5	1	0	2	2	1	-	-	
August	94	Not recorded.	94		109	84	40	3	0.20	0	2	6	10	4	5	6	0	0	0	0	-	-	
September	92		92		106	66(?)	52	2	0.28	1	2	8	13	0	1	8	0	0	0	0	-	-	
October	90		90		98	77	69	1	0.32	0	2	7	9	1	1	11	2	0	0	0	-	-	
November	83		83		95	75	68	4	0.62	2	2	7	7	2	5	3	0	4	1	1	0	0	
December	80		80		91	63	73	3	2.00	3	2	7	6	3	5	3	1	4	2	0	0	0	
Means and Totals	29.84		86		100	66	63	4	7.12	30	3	107	86	32	31	36	7	27	20	17	-	-	

* The total fall is based on 11 years' observations, but the number of days on only three.

PLACE.—PERIM. ORS. A LAT. 12° 39' 0" N., LONG. 43° 26' 0" E.

METEOROLOGICAL TABLE COMPILED FROM SEVEN YEARS' OBSERVATIONS.

MONTH.	BAROMETER. reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.	Clouds, 0 to 10, Mean Amount.	RAIN.		WIND.										No. of Days Gale.	No. of Days Foggy.	REMARKS.							
	Mean.	Ex- treme Height. Range.	Mean Daily Range.	Max.	Min.	Mean.			Total Fall.	No. of Days.	Average Hourly Velocity.	Number of Days from																		
												N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.										
January	Ins. 29.77	0.39	77.4	9	86	60	70	3	One year Ins. 0.47	1.0	19.8	0.2	1.4	11.6	15.2	1.2	0.1	0.4	0.7	0.2	-	-	-	-	-	-	-	-	-	
February	29.74	0.44	78.2	9	87	71	71	3	0.27	0.7	18.2	0.2	0.8	9.0	14.4	0.3	0.1	0.7	1.6	1.0	-	-	-	-	-	-	-	-	-	
March	29.68	0.41	79.8	10	90	71	72	2	0.33	0.9	18.3	0.6	1.7	9.1	12.9	1.9	0.8	1.2	2.0	0.8	-	-	-	-	-	-	-	-	-	
April	29.63	0.44	83.0	10	96	72	70	2	0.01	0.1	18.5	0.9	0.3	7.9	15.7	1.5	0.2	0.4	2.5	0.6	-	-	-	-	-	-	-	-	-	
May	29.59	0.42	86.5	11	100	72	70	2	0.11	0.1	14.0	1.3	1.3	8.8	9.3	1.3	1.1	2.3	4.5	1.0	-	-	-	-	-	-	-	-	-	
June	29.50	0.42	88.2	12	104	72	64	2	0.00	0.0	14.3	0.9	2.7	3.4	1.9	0.4	1.7	6.1	11.9	1.0	-	-	-	-	-	-	-	-	-	
July	29.47	0.38	89.2	13	104	72	58	3	0.04	0.2	16.1	1.9	0.9	2.4	0.8	0.4	3.0	8.9	12.1	0.6	-	-	-	-	-	-	-	-	-	
August	29.40	0.38	88.7	12	101	72	59	3	0.35	0.5	14.4	1.3	2.6	1.8	1.5	0.5	3.1	8.1	11.7	0.4	-	-	-	-	-	-	-	-	-	
September	29.35	0.39	88.0	12	102	71	63	3	0.01	0.1	11.5	1.9	5.4	5.4	5.0	1.0	1.6	2.1	7.1	0.5	-	-	-	-	-	-	-	-	-	
October	29.68	0.41	84.6	11	98	68	61	1	0.06	0.1	18.4	0.0	1.8	9.0	17.4	2.1	0.1	0.0	0.2	0.4	-	-	-	-	-	-	-	-	-	
November	29.76	0.42	80.9	9	90	73	63	2	0.05	0.2	20.0	0.2	1.4	10.9	14.5	2.3	0.4	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	
December	29.80	0.40	78.5	10	88	65	65	2	0.07	0.2	19.4	0.1	1.0	12.1	14.2	2.5	0.5	0.3	0.1	0.2	-	-	-	-	-	-	-	-	-	
Means and Totals	29.65	0.71*	83.6	11	104*	69*	66	2	1.77	4.1	16.9	9.5	21.3	91.4	122.8	15.4	12.7	30.6	51.5	6.9	-	-	-	-	-	-	-	-	-	*During the period of 7 years.

PLACE.—JIDDA. OBS. Δ LAT. 21° 28' 0" N., LONG. 39° 11' 0" E.

METEOROLOGICAL TABLE COMPILED FROM ELEVEN YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 29° and Sea Level.		TEMPERATURE.				Relative Humidity.		RAIN.		WIND.								No. of Days Gale.	No. of Days Fog.	REMARKS.	
	Mean Height.	Ex- treme Range.	Mean.	Mean Daily Range.	Max.	Min.	Clouds, 0 to 10.	Mean Amount.	Total Fall.	No. of Days.	Average Hourly Velocity.	Number of Days from										
												N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
January	Ins. 29.83	0.48	72.5	10	85	58	69	1	Ins. —	1	2											* Rainfall was not measured by gauge. The average number of days on which rain fell was given. The falls were generally slight, and seldom lasted more than an hour. † During the whole period of 11 years, gale force (maximum of 8 Beaufort scale) was only attained 10 times, as indicated; generally from northward, and of short duration.
February	29.92	0.57	72.4	10	86	56	66	1	—	2	2											
March	29.83	0.53	75.8	10	89	59	69	1	0	0	2											
April	29.80	0.54	80.7	10	93	63	69	1	0	0	2											
May	29.75	0.36	83.5	11	107	63	69	1	0	0	2											
June	29.63	0.40	86.0	12	114	71	70	1	0	0	2											
July	29.66	0.35	87.6	10	103	72	68	1	0	0	2											
August	29.65	0.36	83.6	10	100	74	70	2	0	0	2											
September	29.71	0.43	86.8	10	104	66 (?)	76	2	0	0	2											
October	29.79	0.32	83.5	11	93	71	75	1	0	0	2											
November	29.86	0.36	80.3	10	94	65	72	1	—	1	2											
December	29.90	0.41	78.9	10	86	63	70	2	—	1	2											
Means and Totals	29.79	0.72	81.2	10	114	56	70	1	—	5	2										†	

PLACE.—ADEN. OBS. Δ LAT. 12° 47' 0" N., LONG. 44° 59' 0" E.

METEOROLOGICAL TABLE COMPILED FROM YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.		RAIN.		WIND.										REMARKS.		
	Mean Height.	Ex- treme Range.	Mean.	Daily Range.	Max.	Min.	Clouds, 0 to 10.	Total Fall.	No. of Days.	Average Hourly Velocity.	Number of Days from												
											N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	No. of Days Gale.		No. of Days Fog.	
January	Ins. 29.94	Ins. 0.42	75.9	10	86	66	°	72	4	Ins. 0.26	2	13	0	9	12	5	1	1	0	0	3		
February	29.92	0.41	76.8	10	90	66	°	72	4	0.21	2	14	0	9	11	5	1	0	0	0	2		
March	29.86	0.46	79.1	11	98	68	°	72	4	1.17	2	15	1	10	13	4	1	0	0	0	2		
April	29.80	0.41	82.7	13	101	72	°	70	3	0.39	1	15	0	9	13	2	1	1	1	0	3		
May	29.72	0.50	85.8	13	102	73	°	69	2	0.27	1	11	1	7	7	4	5	3	1	0	3		
June	29.61	0.45	87.6	11	101	79	°	58(?)	1	0.00	0	8	0	1	1	6	12	7	1	0	2		
July	29.56	0.40	85.9	11	101	71	°	68	2	0.01	0	10	0	1	1	8	12	8	0	0	1		
August	29.59	0.41	85.0	12	96	69	°	66	2	0.27	1	11	0	1	2	9	11	6	0	0	2		
September	29.69	0.40	87.0	12	100	73	°	69	2	0.07	0	9	0	3	4	7	7	5	1	0	3		
October	29.83	0.41	82.8	14	100	70	°	65	2	0.00	0	13	1	8	10	4	3	2	0	0	3		
November	29.91	0.37	79.5	13	97	68	°	67	2	0.10	1	12	0	7	13	4	2	1	0	0	3		
December	29.96	0.34	76.6	11	93	64	°	70	4	0.23	1	12	0	8	13	6	1	0	0	0	3		
Means and Totals	29.78	0.79	82.0	12	102	64	°	68	3	2.97	11	12	3	73	100	64	57	34	4	0	30		

PLACE.—ZEPH. OBS. A LAT. 11° 21' 30" N., LONG. 43° 29' 0" E.
 METEOROLOGICAL TABLE COMPILED FROM ONE YEAR'S OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity. Clouds, 0 to 10, Mean Amount.	RAIN		WIND.										No. of Days Gale.	No. of Days Fog.	REMARKS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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